THE MARINE REVIEW

VOL. XXXIII. CLEVELAND, FEBRUARY 8, 1906. No. 6.

MEASURING FOREIGN VESSELS.

On the subject of measurement of light and air spaces of foreign steam vessels Mr. Eugene Tyler Chamberlain, commissioner of navigation, has written a letter to the collector of customs at Boston which is self-explanatory. It is as follows:

"Referring to your letter dated the 3d instant, this office invites your attention and that of the customs officers measuring foreign vessels in the United States to the lack of uniformity found to exist at the principal ports in ascertaining the gross and net tonnage of foreign vessels whose recorded tonnage, as expressed in their certificates or registers, must be added to in the United States to bring the net tonnage to that on which tonnage tax legally accrues. In the registers of many foreign vessels only so much of the light and air space is added to the gross tonnage and to the propelling power as will bring the volume of the propelling power above the 13 per cent of the gross tonnage required to entitle the vessel to a deduction of 32 per cent of the gross tonnage. If there are such additions, however, the computations should be substantially the same as if the vessel were measured under the regulations of the United States, which in Paragraph I, Article 89, of 1899, contemplate the measurement, subject to certain limitations when authorized by this office, of the entire portion of the space above the crown of the engine room and above the tonnage deck, which is framed in for the machinery or for the admission of light and air and not required to be added to the gross tonnage. The regulations do not sanction the addition of a part only of such space or spaces.

The addition of spaces, such as shelter deck, bridge, poop, deck space, etc., claimed to be open spaces but found to be closed, and available and used for cargo or stores, to the gross tonnage, often increases the latter to such an extent that the volume of the propelling power does not amount to 13 per cent of the gross tonnage without the addition of the light and air space omitted from the register and propelling power spaces.

In adding such light and air space, under the regulations cited, to arrive at the proper dutiable tonnage, computation should be made by admeasuring officers in the United States substantially in accordance with the following example:

The register of a certain foreign vessel shows tonnage as follows:

	Tons.
Under tonnage deck	2,669.05
Chart house	4.48
Forecastle	38.06
Round houses	64.99
Excess hatchways	45.23
Light and air	54.05
Gross	2,875.86
Deductions:	
Propelling power (32 per cent)	920.28
Crew	59.82
Master	5.09
Chart room	4.48
Boatswain's stores	28.75
	1,018.42
Net	1,857.44

In this case, to arrive at the proper dutiable tonnage, computations are made by the measuring officer in the United States as follows:

From foreign register, with requisite additions made in the United States:

From British Register:	Tons.	Tons.
Under tonnage deck		2,669.05
Chart house		4.48
Forecastle		38.06
Round houses		64.99
Excess hatchways		45.23
Light and air		54.05
Bridge (added)		230.25
Poop (added)		65.67
Additional light and air (added)		36.05
Gross		3,207.83
Deductions:	Tons.	
Propelling power, plus 75 per cent	717.72	
Crew	59.82	
Master	5.09	
Chart room	4.48	
Boatswain's stores	28.75	
		815.86
Net		2,391.97

Showing an addition to the net tonnage of 534.53 tons.

	Tons.
The actual propelling power is	320.03
Total light and air space	90.10
Total	410.13
13 per cent of 3,207.83 (gross tonnage)	417.01
Actual propelling power, light and air added	410.13
Balance	6.88

Needed to entitle the vessel to a deduction of 32 per cent of the gross tonnage, which necessitates the use of Form B, or 175 per cent of the propelling power space. Light and air space need not be measured in the United States when the register shows there was no omission from the tonnage of the vessel. Masters should be required to present, on entering, any certificate of measurement granted at another American port. Objection has been made that it is difficult to secure a correct admeasurement of the boiler and engine rooms after all the machinery has been set up, but the Bureau is advised that while the spaces may be dirty and the process of admeasuring intricate they can be admeasured.

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MERCHANT MARINE OF ALL COUNTRIES.

The thirty-sixth annual issue of the "General Register of the Merchant Navies of all Countries," published every autumn by the Bureau Veritas, has made its appearance and the figures therein show that the number of sailing ships of 50 tons and upwards now existing is 27,122, with a total measurement of 7,620,679 register tons, against 26,873, of 7,811,957 tons, a year ago. Of steamers of 100 tons and upwards there are 14,018, measuring 28,369,140 register gross tons and 17,799,102 tons net, against 17,532, with 27,900,457 tons gross and 17,188,661 tons net. This apparent falling off in the number of steamers is stated in an explanatory note to arise from the fact that last year's figures included a number of vessels of less than 100 tons that were registered with the Bureau Veritas but that this year all these small vessels have been left out. The sailing fleets are dealt with first in the book, and the number of ships and their aggregate tonnage under the flags of the different countries owning 10,000 tons and upwards are thus set out:

	1905-6.		1904-5.	
	No.	Register tons.	No.	Register tons
British	6,589	1,912,360	6,773	2,080,243
American	3,765	1,513,178	3,550	1,465,819
Norwegian	1,647	741,970	1,601	749,354
Russian	3,243	566,165	2,535	534,166
French	1,414	517,069	1,549	494,123
German	955	492,411	948	506,010
Italian	1,500	445,002	1,440	523,910
Swedish	1,473	266,613	1,484	262,899
Turkish	879	178,262	1,582	173,365
Greek	880	167,243	867	170,147
Japanese	1,336	166,723	889	184,220
Danish	801	120,441	791	121,662
Dutch	651	89,918	670	90,573
Spanish	541	85,583	524	86,323
Brazilian	340	74,475	345	76,252
Portuguese	266	53,565	270	56,449
Argentine	161	40,581	90	42,222
Chilian	84	39,346	156	43,394
Uruguayan	72	31,062	76	32,053
Peruvian	35	25,039	36	24,662
Austrian	105	16,776	102	19,494
Cuban	120	11,605	120	12,066
Mexican	29	8,451	32	10,564

It appears from the foregoing figures that the sailing tonnage of only six of the countries in the list has increased—namely, America, Russia, France, Sweden, Turkey, and Peru—while the other countries own less than they did last autumn.

A list is next given of the countries owning over 10,000 tons gross of steam vessels; and the steam tonnage under each flag, compared with that of a year ago, is thus recorded:

	1905-6.		1904-5.	
	No.	Tons gross.	No.	Tons gross.
British	6,079	14,919,578	8,406	14,889,175
German	1,273	3,033,333	1,479	2,887,130
American	876	1,756,327	901	1,720,176
French	577	1,222,008	835	1,266,486
Norwegian	916	1,057,822	1,037	1,030,637
Japanese	502	843,710	556	645,978
Russian	537	637,757	590	637,114
Italian	349	696,500	379	735,212
Spanish	386	679,645	456	713,775
Dutch	319	644,961	392	631,660
Swedish	662	567,969	730	528,728
Austrian	231	550,696	266	555,482
Danish	384	528,005	408	511,310
Greek	185	331,921	201	347,160
Belgian	85	162,005	126	154,093
Brazilian	192	145,502	202	136,214
Turkish	35	98,356	114	103,915
Argentine	101	85,321	120	78,995
Chilian	40	65,717	54	65,066
Chinese	35	56,289	43	56,476
Portuguese	28	49,439	40	48,189
Cuban	40	45,031	43	41,581
Roumanian	13	25,281	26	25,103
Mexican	31	21,220	30	17,800
Uruguayan	21	20,603	32	26,822
Egyptian	11	10,260	15	11,274

Here we find a falling off in eight cases—namely, France, Italy, Spain, Greece, Turkey, China, Uruguay, and Egypt—while the steam tonnage of all the other countries has increased in the past twelve months.

In conclusion, we annex a table showing the total steam and sailing tonnage under the flags of all the nations (stated in round figures) in each year, commencing with 1893:

Autumn of	Steamers Net reg. tons.	Sailers. Reg. tons.	Total net reg. tons
1893	9,674,000	9,829,000	19,503,000
1894	9,994,000	9,547,000	19,541,000
1895	10,360,000	9,324,000	19,684,000
1896	10,761,000	9,136,000	19,897,000
1897	11,427,000	8,894,000	20,321,000
1898	11,687,000	8,693,000	20,380,000
1899	12,165,000	8,347,000	20,512,000
1900	13,465,000	8,265,000	21,070,000
1901	14,663,000	8,119,000	22,782,000
1902	15,431,000	8,078,000	23,510,000
1903	16,317,000	8,066,000	24,383,000
1904	17,189,000	7,813,000	25,002,000
1905	17,799,000	7,621,000	25,420,000

THE UNITED STATES THIRD IN NAVAL STRENGTH.

During the twenty-three years from 1883 to 1905 the appropriations for the naval establishment of the United States have passed the billion-dollar mark. The total and the distribution among the years are given in the following table, prepared by Clerk Pulsifer, attached to the Senate Committee on Naval Affairs:

1883	$14,819,976.80	1895	$25,475,362.57
1884	16,782,005.02	1896	30,615,714.43
1885	16,252,920.01	1897	31,220,894.57
1886	16,052,050.88	1898	125,301,975.78
1887	16,489,907.20	1899	62,547,793.06
1888	26,203,054.76	1900	53,582,770.90
1889	22,150,987.38	1901	69,516,775.45
1890	22,206,063.62	1902	84,382,551.80
1891	25,329,922.00	1903	84,672,048.73
1892	31,664,850.70	1904	103,633,115.40
1893	23,611,257.09	1905	115,420,997.75
1894	22,394,124.99		
Total			1,040,449,011.79

As will be seen from the above table, the greatest expenditures on account of the navy were in the years 1898, 1905 and 1904, in the order named. In each of those years the expenditures exceeded $100,000,000.

A table comparing the relative strength of the great navies of the world places the United States third in the list. Great Britain, of course, stands at the head with a tonnage of 1,907,998 tons, distributed among 497 vessels, of which sixty-one are battleships. France is second with 800,958 tons, distributed among 533 vessels, of which twenty-five are battleships. The United States is third with 701,797 tons, distributed among 158 vessels, of which 25 are battleships. After the United States follow in order Germany, Japan, Russia, Italy and Austria.

ALTERATION ON THE VIRGINIAN.

The Allan Line turbine steamer Virginian, is about to be taken in hand by the builders, Messrs. Workman Clark & Co., Belfast, for a change of propellers, three-bladed propellers taking the place of the four-bladed ones now on the shafts. To compensate for the loss of a blade, the new propellers will have an increased diameter of one foot. The number of revolutions will also be reduced to about 300. The alteration will, it is believed, add materially to the success of the ship, for the edge friction will be greatly minimized by the smaller number of blades and the slower engine speed. The new propellers will be of the best metal, and great care has been exercised in selecting the pitch. H. M. Ship Iris has been subjected to a similar change of propellers, with the result that the high speed she had previously attained was increased by at least a knot.

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TERSHANA—A TURKISH SHIP YARD.

(A correspondent in *The Engineer*, London.)

In Turkish Ters means a ship, Hana means a fabric or works; so that Tershana means the ship yard of the Turkish government. It is situated along the Golden Horn, beyond the second floating bridge and at its entrance is the Admiralty building, a square building of Moorish design, where the Minister of Marine and other Pashas do congregate, each attended by his kavass or aide-de-camp. There the German band plays in the afternoon when the minister is in his bureau. There, there is collected a miscellaneous crowd composed of all sorts. Turkish women crowding around the Mazabadjee or cashier of the Admiralty, waiting for pensions that have not been paid for years; officers imploring the payment of only one month's salary; laborers begging for just one medjidere, three shillings and fourpence, in payment in part for a week's work. There also you will see Greek and Armenian contractors begging for something on account of goods supplied and not paid for. The Mazabadjee has a heart of steel. To one he says: "Come back next year about this time." To another he says: "Ben da para yok," which is to say, being interpreted, "I have got no money." To an Armenian merchant he says: "If you won't have patience I will have you put in prison," and so he gets rid of them all. Some are grumbling, and the woman are crying. The new minister is a wit in his way. To one applicant for money he said: "Look here, you may beat me, you may imprison me, you may torture me, you may even kill me; but there is one thing you cannot do, and that is you cannot get any money out of me." The late minister, Hassan Pasha, left a pile of debt to the arsenal, and a large fortune to his numerous wives and children, so that the present minister has to face a multitude of creditors, and a very much reduced revenue.

But to pass through the gates into the arsenal or ship yard proper. The length along the shores of the Golden Horn is about 1½ miles, and on the right are the different stores in which are kept various things suitable for the service, such as ship stores, sail cloth, ropes, old chains, anchors, etc., etc. These stores are in a more or less state of dilapidation. On the left in the Golden Horn there are a number of torpedo boats rapidly going to decay. Amongst the rest may be seen the submarine boats which Nordenfelt built, now red with rust. They were never used. Passing these we come to a number of old battered hulks, wood and iron, paddle and screw, and in the foreground a collection of old iron which a marine store dealer would be proud of consisting of old marine boilers, funnels, masts, old marine engines, paddle wheels, propellers, crank shafts, broken down gun carriages, cranes, etc. Also there are the two locomotives that many years ago used to carry the traffic along the railway which runs right through the arsenal. These have retired, and mean to spend the remainder of their days on the universal scrap heap.

Passing on, we now come to what is called the square of Jamalti. On the left we now have something better to look at, for there we see the handsome shear legs made by Day & Summers & Co., which are still in a good state of preservation. On the right is the skeleton of a cruiser which was laid down twelve years ago. The frames were set up, and she was partly plated, but in the interval she became obsolete, and is now being cut up and consigned to the scrap heap. Passing on still, on the right we have a collection of buildings, some with roofs, but mostly without, containing a lot of miscellaneous materials, and on the left in the Golden Horn another collection of old shops which an irreverent Englishman called Rotten Row. In the foreground appears the usual collection of old metal. A little further on there is moored the new American cruiser and the one built by Armstrong, and, to bear them company, the fifty-year-old ironclads, which have been repaired, and which have a speed of nine to ten knots. On the right there are some more shops, and the offices of the Chief Constructor of the Turkish Navy. After this we come to the ship building slip, where there is a large shed where ships of 300 ft. or 400 ft. can be built, but nothing is being done, and the shed is sadly in want of repair. Some smaller boats are on the other slips, but nothing has been done for years, and the unfinished hulks are red with rust. Next we reach a group of buildings consisting of, first, the six-ton steel furnace which was built twenty years ago on the Radcliffe system, and which has been used frequently, but which is now obsolete and falling into ruins. Near this building is the marine shop where, at one time, a good many marine engines were built, but is now idle. On the other side is what is called the Forge, with one or two antiquated steam hammers; and close by it are the pumping engines, auxiliary engines, cylinders, valves, pipes and other parts of a 3,000-ton hydraulic forging press. This machinery was delivered about twelve years ago, and has not been unpacked. On the other side of the square is situated the tube factory, which has a collection of machinery for making steel, iron, and copper tubes, but there is no one to direct it, so it stands idle like the rest. In the middle of this square there is the usual collection of 2,000 or 3,000 tons of miscellaneous material, including a great number of steel ingots with unknown analysis steel, scrap, old engines, boilers, etc., etc. Near by is the 40-ton Siemens steel furnace, which turned out the base and entablature for the 3,000-ton hydraulic forging press twelve years ago. These steel castings lie alongside as they left the molds. This plant, with its 50-ton steam crane, is rapidly going to decay; it has not been worked for many years. In the same building is the rolling mill, which is also in a state of decay. Passing on we come to the boiler shop, which has a Tweddles' hydraulic plant, also in a out-of-repair condition. This shop is full of unfinished and old boilers, and also miscellaneous scrap; you have to thread your way through it. The machines here as elsewhere are in a filthy state.

Crossing over to the other side we come to the gun factory, the shell factory, and what is called the Fuze factory. This is under the control of a Pasha, whose only qualification is that he was once a naval attache somewhere. In the shell factory all the shells are made from forgings, although there is a complete plant of machinery for making cast steel shells somewhere; who knows, like other machinery it lies unpacked.

The gun factory was erected to build guns 9-in. bore and 35 calibers long, twelve years ago, and during this period it has produced one 6-in. gun of 35 calibers, and done some minor repairs to smaller guns. This building is about 300 ft. long and 60 ft. wide, and is served by a powerful shaft-driven crane of 60 tons. Owing to the great increase in the length of modern guns the machinery is now practically obsolete. A number of old machines have been collected from other parts of the arsenal and put in here.

Outside in the yard is a very fine steam traveling crane to lift 75 tons, 40 ft. from the ground to under the girders. This is of the Goliath type, and if cleaned and painted would be an ornament to the place. It is used for shrinking and oil hardening, and is of the horizontal type. Now for the management. There are forty-six Pashas, an innumerable number of Beys, the remainder being marines and native workmen. There are one or two Englishmen and a few Germans, but all hold inferior positions. At one time there were Englishmen in charge of the boiler shop, the tube factory, the ship building yard, and the marine engine shop. But the fiat of the late minister went forth, and all had to go, and the management was placed in the hands of Turkish officers, with the result I have described.

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An Englishman I once met told me that he had called on the late Minister of Marine, who asked him to go through the works and give him his opinion of the them when he returned. This he did, and when he returned his Excellency asked him his opinion in Turkish. The Englishman replied in the same language, "Excellency it is a huge scrap heap."

SIX MONTHS' SHIP BUILDING IN THE UNITED STATES.

The bureau of navigation reports 542 sail and steam vessels of 136,097 gross tons built in the United States and officially numbered during the 6 months ended December 31, 1905, as follows:

	WOOD				STEEL				TOTAL	
	Sail		Steam		Sail		Steam			
	No.	Gross	No.	Gross	No.	Gross	No	Gross	No.	Gross
Atlantic and Gulf	148	20,160	162	5,829	4	2 551	27	18 843	341	47,383
Porto Rico	2	15	....	.....	....	.....	....	.....	2	15
Pacific	14	1,898	44	2,709	....	.....	....	.....	58	4,605
Hawaii	....	.....	....	.....	....	.....	....	.....	....	.....
Great Lakes	5	157	31	815	....	.....	21	80,932	57	81,904
Western Rivers	....	.....	81	1,838	....	.....	3	352	84	2,190
Total	169	22,228	318	11,191	4	2 551	51	100,127	542	136,097

During the corresponding 6 months ended December 31, 1904, 542 sail and steam vessels of 92,590 gross tons were built in the United States and officially numbered, as follows:

	WOOD				STEEL				TOTAL	
	Sail		Steam		Sail		Steam			
	No.	Gross	No.	Gross	No.	Gross	No.	Gross	No.	Gross
Atlantic and Gulf	195	57,180	123	4,688	2	662	25	16,955	345	79,485
Porto Rico	2	22	....	.....	....	.....	....	.....	3	22
Pacific	16	2,855	57	3,937	....	.....	....	.....	73	6,792
Hawaii	....	.....	....	.....	....	.....	....	.....	....	.....
Great Lakes	12	166	20	429	....	.....	5	2,498	37	3,093
Western Rivers	....	.....	84	3,187	....	.....	1	19	85	3,206
Total	225	60,223	284	12,241	2	662	31	19,472	542	92,598

	No.	Gross
Total calendar year ended Dec. 31, 1905	1,054	306,563
" " " " " " 1904	1,065	265,104
" " " " " " 1903	1,159	381,970
" " " " " " 1902	1,282	429,327
" " " " " " 1901	1,322	376,129

INSPECTORS MUST ASSIST DISTRICT ATTORNEYS.

Secretary Metcalf of the department of commerce and labor has issued instructions to the supervising inspectors of the steamboat inspection service requiring them in the future to assist to the best of their ability, within reasonable limits, the United States district attorneys in the enforcement of the steamboat inspection laws. In a statement given out at the department today in connection with the issuance of the letter of instructions, it is said:

"It has appeared in several cases of recent date involving violation of the steamboat inspection laws that a certain letter of instructions, issued by the acting secretary of the treasury of Oct. 26, 1881, established a ruling which seriously interfered with the administration of justice in such cases. The substance of this ruling was that local inspectors of steamboats should not in any way assist United States district attorneys in preparing for the trial of cases of violation of the steamboat laws. The circumstances which gave rise to this particular letter are not now known, but the evils that attended the enforcement of this ruling have become serious, and the secretary has rescinded said ruling by letter of instructions.

Secretary Metcalf in his letter to the supervising inspectors says:

"Your attention is called to letter of the acting secretary of the treasury, dated Oct. 26, 1881, on page 289 of the "Steamboat Inspectors Manual," edition of 1889, with especial regard to the following paragraph of said letter:

" 'If, from the nature of the testimony, the inspectors are satisfied that an officer has committed an infraction of law involving a fine, the papers should be transmitted to the United States attorney, unaccompanied by any testimony, opinion, or finding of the local inspectors, or any information beyond the fact that the charge is for violation of some section or sections of law which shall be specified; it is for the court to decide, at the trial of the case whether the violation is sufficiently clear to warrant a fine being imposed.' The prohibition contained in the words 'unaccompanied by any testimony, opinion, or finding of the local inspectors, or any information beyond the fact that the charge is for violation of some section or sections of law, which shall be specified,' is hereby rescinded. The effect of said paragraph has been to prohibit the transmission by the local inspectors of any testimony, opinion, or finding of said inspectors, or of any information beyond the fact that the charge is for violation of law in cases of misconduct of licensed officers, involving a fine. In short, the officers of the service have thereby been wholly forbidden to help the officers of the department of justice in enforcing the law. No such condition of affairs can be permitted to continue. Whatever may have been the circumstances under which the said letter was issued, the harmful effects of the principle established thereby have become too obvinous to admit of dispute, and the ruling in said letter has been frequently used to obstruct the proper course of justice and to prevent the salutary punishment of licensed officers under the penal provisions applicable to them."

ERIE CANAL STATUS.

In the first annual report to the legislature N. V. V. Franchot, state superintendent of public works, points out that the number of boats navigating the state canals has fallen from several thousand to not more than 600. This is, he believes, due to boat builders ceasing their activity until the barge canal is ready for operation. The superintendent recommends the abandonment of certain parts of unused canals, which would curtail the annual expenditures. The total appropriation for 1905 of $1,101,044 was $170,000 less than was appropriated for the previous year, the appropriation for ordinary repairs being $800,000, as against $820,000 in 1904. Supt. Franchot has this to say with reference to the future of the work, and the suggested appropriation by the present legislature of $40,000,000 for its continuance:

"The original appropriation made three years ago was $10,000,000, and yet of this sum less than $2,000,000 has thus far been expended and the obligations incurred on account of the appropriation are less than $7,000,000. Of the $10,000,000 of bonds authorized to be sold, only $2,000,000 have been issued so that actually the burden thus far assumed is confined to the interest rate of 3 per centum on the $2,000,000. It will be understood therefore that were the legislature to make an appropriation of $40,000,000 and contracts to the full amount be entered into in the immediate future, the payments made on account of work as it progressed would annually for some time to come consume but a small portion of the total appropriation, and that several years would of necessity elapse before this total would be exhausted. These facts, when studied, it seems to me will somewhat allay the fears of those who may have accepted the proposition to appropriate $40,000,000 as certain to impose instanter a greatly increased burden."

The Burlee Dry Dock Co., Port Richmond, Staten Island, will build two tugs for J. B. King & Co., of New York.

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THE ACTION OF SEA-WATER UPON CONCRETE.

BY W. J. SANDEMAN, M. INST. C. E. IN *Engineering*, LONDON.

It has been known for a considerable time that chemical action takes place between the acids contained in sea-water and the lime contained in Portland cement; and that if Portland-cement concrete be made porous or permeable, so as to enable sea-water to act continuously throughout its mass, that the cement will gradually become disintegrated, and ultimately be destroyed by such action.

This has happened, and is still happening, to a number of dock and pier works both in this country and abroad; and that such destruction has been due to the porosity of the concrete and the action of sea-water upon it has been proved by investigation of concretes in dock works that have failed. See "Notes from Reports upon Concrete, in Aberdeen Dry Dock" by Prof. Brazier, of Aberdeen University, and Mr. John Pattison, Northumberland County Analyst; also papers by Dr. Michaelis, of Berlin, and R. Feret, of Boulogne.

PROPOSED STANDARD PROPORTIONS FOR CONCRETES.

TABLE I.—IMPERVIOUS CONCRETES FOR SPECIAL PARTS OF WORKS, SUCH AS AROUND GREENHEART DOCK SILLS AND GATE QUOINS. NO. 2 CONCRETE IS ALSO ADAPTED FOR PIER WORKS NEAR LOW-WATER LEVEL WHERE EXPOSED TO WASH OF WAVES OR STRONG CURRENTS.

Concrete without Displacers.

Number of Concrete.	Volumes. Cement.	Sand.	Gauged by Meshes ¾ In. Square.	Value of Mortar Produced from Cement and Sand.	Ratio of Mortar to Gravel or Broken Stone.	Unit Costs of Concretes per Cubic Yard, taking No. 6 Concrete as the Standard of Comparison.
					per cent.	
1	1	1½	1¾ broken stone	1.75	100	141
2	1	1½	2 gravel	1.75	87.5	134

TABLE II.—IMPERVIOUS CONCRETES FOR MARINE WORK, SUCH AS SEA PIERS AND DRY DOCKS, ALSO RESERVOIR WALLS, ETC.

Concrete without Displacers.

Number of Concrete.	Volumes. Cement.	Sand.	Gravel Gauged by Meshes 1½ In. Square and Broken Stone by Meshes 1 In. Square.	Volume of Mortar Produced from Cement and Sand.	Ratio of Mortar to Gravel or Broken Stone.	Unit Costs of Concretes per Cubic Yard.
					per cent.	
3	1	2	3 gravel	2.1	70	119
4	1	2	3½ "	2.1	60	117
5	1	2	3 broken stone	2.1	70	115

Concrete with Displacers.

—	—	—	Gauged by Meshes 1½ In. Square.	Displacers.	—	Ratio of Mortar to Gravel and Displacers.	—
6	1	2	3 gravel	¼ cubic yard	2.1	per cent. 48.8	100

Note.—For concrete deposited in situ under water, also near low-water level, where exposed to wash from waves or tidal currents, no displacers should be used.

While the author has had experience of this destructive action of the sea-water has also had abundant proof of the permanent stability of dock and pier works which he has constructed in impervious concrete.

PROPOSED STANDARD PROPORTIONS FOR CONCRETES.

With the view to arrive at standard proportions for concretes which would enable them to permanently resist the action of sea-water, the author has carefully studied the question, and the following record if the results at which he has arrived is based on actual tests and long experience in the construction of dock and pier works in concrete; and although the proportions recommended, and the system of measuring sand and aggregates separately differ from ordinary practice, yet the author contends that for sea works, and particularly for graving docks, should proportions be used other than those proposed in Tables I, and II. there would be risk of percolation by sea-water, which would certainly be followed by disintegration of the concrete.

TO MAKE IMPERVIOUS CONCRETE.

Permeability in concrete is due either to the porosity or the insufficiency of the mortar, or to faulty manipulation of the materials. For impervious mortar the maximum proportion of sand must not exceed two parts to one of cement. For impervious concretes the volume of the mortar must be in excess of that of the maximum voids in the aggregate, so as to fill these and surround the aggregate. To effect this the most extreme conditions which can occur in practice must be allowed for—viz., maximum reduction in volumne of cement and sand when made into mortar; maximum voids in the aggregate; and unavoidable irregularities in manipulation of concrete.

TABLE III.—ORDINARY CONCRETES (NOT IMPERVIOUS) FOR FOUNDATIONS, RETAINING-WALLS, ETC.

Concrete without Displacers.

Number of Concrete.	Volumes. Cement.	Sand.	Gravel Gauged by Meshes 2½ In. Square, and Broken Stone by Meshes 1½ In. Square.	Volume of Mortar Produced from Cement and Sand.	Ratio of Mortar to gravel or Broken Stone.	Unit Costs of Concretes per Cubic Yard.
					per cent.	
7	1	2	4 gravel	2.1	52.5	114
8	1	2½	5 "	2.45	49	107
9	1	3	5 broken stone	2.8	56	108
10	1	3	6 gravel	2.8	46.6	102

Concrete with Displacers.

—	—	—	Gauged by Meshes 1½ In. Square.	Displacers.	—	Ratio of Mortar to Gravel and Displacers	—
11	1	3	4 gravel	¼ cubic yard	2.8	per cent. 48.8	107

TABLE IV.—CHEAPER CONCRETES FOR WORKS IN WHICH NO GREAT STRENGTH IS REQUIRED.

Concrete without Displacers.

Number of Concrete.	Volumes. Cement.	Sand.	Gravel Gauged by Meshes 2½ In. Square, and Broken Stone by Meshes 1½ In. Square.	Volume of Mortar Produced from Cement and Sand.	Ratio of Mortar to Gravel or Broken Stone.	Unit Costs of Concretes per Cubic Yard.
					per cent.	
12	1	4	7 broken stone	3.5	50	100
13	1	4	8 gravel	3.5	43.7	97

Concrete with Displacers.

—	—	—	Gauged by Meshes 1½ In. Square.	Displacers	—	Ratio of Mortar to Gravel and Displacers	—
14	1	4	5 gravel	¼ cubic yard	3.5	per cent. 48.8	86

For impervious concretes in which displacers are used it is necessary that the size of gravel be limited to what would be gauged by a sieve with meshes 1½ in. square, and broken stone to what would be gauged by meshes ⅞ in. square. When gravel is above that size it separates from the mortar, accumulates together while being deposited, and causes voids in the concrete.

The proportions of materials in Tables I and II are such as will fulfil the foregoing conditions, and (with proper manipulation) produce concretes which will perfectly resist the action of sea-water.

VOIDS IN MATERIALS AND REDUCTION IN VOLUME.

The author ascertained that the voids in gravel vary from 34 to 40 per cent of the volume of the gravel, and the voids

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in broken stone from 34 to 54 per cent. The reduction in volume of cement and sand when mixed and made into mortar varies with different ratios of cement to sand, with different ratios of voids in the sand, and with the amount of moisture in the sand; damp sand (such as is often used for concrete) bulking much more largely than dry sand.

The author found that the reduction in volume of cement and ordinary dry sea-sand by being made into mortar varied from 12 per cent for 1 to 4 mortar to 22 per cent for 1 to 1 mortar, and that the reduction in volume for 1 to 1 mortar when the sand was damp increased to about 30 per cent.

Taking the maximum reduction in volume of cement and sand when made into mortar at 30 per cent, the only other reduction between the volume of the dry materials used and of the concrete produced is that due to the amount of mortar which goes to fill the voids in the gravel or stone. These voids should be taken at the maximum—viz., 40 per cent for gravel, and 54 per cent for broken stone.

These reductions combined make a total reduction between the volume of the dry materials, and that of the concrete, varying from 35 per cent for concrete in the proportion of 1 cement, 2 sand, 3 gravel, to 44 per cent for concrete in the proportion of 1 cement, 4 sand, 7 broken stone.

DISPLACERS.

The proportion of ordinary-sized rubble displacers which can be satisfactorily deposited by hand in concrete was ascertained by the author not to exceed one-fourth of the volume of the set concrete.

MODE OF ASCERTAINING WEIGHTS OF MATERIALS AND RELATIVE COSTS OF CONCRETES.

Taking, as an example, impervious concrete in the proportion of 1 cement, 2 sand, and 3 gravel with displacers, the weights of the materials and the cost of a cubic yard of concrete will be ascertained as follows:—1 cement, 2 sand = 3 vols. allow 30 per cent, or 0.9 vol., for reduction by being made into mortar. Gravel 3 vols., allow 40 per cent, or 1.2 vols., for voids occupied by mortar. Total, 6 vols., reduced by 2.1 vols. = 35 per cent reduction, or the ratio of dry materials = 1.538 to 1 of concrete. 1.538 cubic yards = 41.5 cubic feet, which, divided in the ratio of the materials—viz., 1—2—3,—will give:—

	Assumed rates per ton.	s.	d.
6.9 cu. ft. cement × 85½ lb. = 5.26 cwt.....at	28s	7	4
13.8 cu. ft. sand × 85 lb. = 10.5 cwt.....at	3s	1	7
20.8 cu. ft. gravel × 112 lb. = 20.8 cwt.....at	3s	3	1
41.5		12	0
Average cost of mixing and conveying materials, including use of plant (say).....		3	0
Timber boarding and water.....		1	3
		16	3
Contractors' profit (say) 15 per cent.....		2	5
Cost of one cu. yd. of concrete without displacers....		18	8
Deduct one-fourth for displacers.....		4	8
		14	0
Add ¼ cu. yd. = 6¾ cu. ft. of stone as displacers × 140 lb. per cubic foot = 8.44 cwt. at 4s per ton.....		1	8
Cost of 1 cu. yd. of concrete with displacers.....		15	8

The foregoing estimated cost would be about 5 per cent above the average cost of concrete estimated in the same way, on account of maximum reduction of cement and sand, and maximum voids having been taken.

The following tables show proposed standard proportions for concretes for sea-works and concretes for general purposes, and their relative costs estimated in the foregoing manner; also the volumes of mortar produced from cement and sand, and the ratios of mortar to gravel or broken stone.

It will be seen that more mortar is allowed for concrete in which broken stone is used, as it does not yield to treading or ramming like concrete made with gravel, and does not allow displacers to sink readily into it. Concrete made with broken stone, although it can be made impervious when displacers are used, is therefore not so well adapted to receive them.

Concretes Nos. 7 to 10 and Nos. 12 and 13 have a ratio of mortar which would not allow of displacers being used, and for these the gravel may vary in size up to what would be gauged by meshes 2½ in. square, and broken stone up to what would be gauged by meshes 1½ in. square.

The tables show the reduction in cost, without diminution in strength of concrete, which is obtained by the use of displacers; No. 6 concrete of 1 cement, 2 sand, 3 gravel with displacers, costing 19 per cent less than the same concrete without displacers.

The cost of No. 6 is also the same as that of the much weaker concrete No. 12, consisting of 1 cement, 4 sand, and 7 broken stone without displacers.

HOWDEN'S FORCED DRAFT.

A noteworthy fact in connection with what may now almost be termed the "triumphal march" of the steam turbine, as applied to ship propulsion, is that practically all the turbine steamers so far produced have been fitted with boilers in which the combustion is controlled by Howden's forced draft. In these steamers the enhanced economy attained over the few which have been fitted with closed stokehold, or other type of forced draft, has been so pronounced as to make it certain that the application of this system of hot-air forced draft, in itself places turbine engines in a most favorable position as respects economy compared with well-designed triple or quadruple reciprocating engines. Both the latest Cunard vessels—the Caronia and Carmania—on which at present exhaustive experiments are being made as to the comparative steam consumption of the two types of engines, the ordinary reciprocating engines in the first, and the turbine engines in the last named, are fitted with duplicate boilers worked with the Howden forced draft. Both vessels, therefore, have boiler plants of the highest efficiency, whereby means are afforded of making a thoroughly accurate comparison. The two new 25-knot express steamers, now building for the Cunard Line, are also being fitted with this system, as well as the new Canadian Pacific express steamer Empress of Britain, recently launched by the Fairfield Co., and her sister still on the stocks, the Empress of Ireland. It is now also being adopted largely in express channel steamers—the Ostend-Dover turbine steamer Princesse Elizabeth, for example, which is understood to be the fastest passenger steamer afloat, having her boilers fitted with the Howden system. About 2,000 steamers in all have now been fitted with an indicated horsepower of considerably over 6,000,000. Warships are also now very largely fitted with the Howden system of controlled combustion; in short, practically every ship of any importance now launched is fitted with this system, which gives a greatly increased efficiency of the boiler installation, thereby reducing correspondingly the weight and space occupied. The reduction in coal consumption effected admits, in the case of merchant ships, of increased cargo space being secured through the reduction of bunker space necessary. The system also renders the propulsive power of the ship entirely independent of the state of the atmosphere. The combustion is effectively regulated quite independently of what may be the direction of the wind or the state of the temperature. This latter advantage is, obviously, a most valuable one for ships trading in the tropics. By this system also, the stokeholds in vessels so employed are rendered quite cool, and easy to work in. A considerable portion of the forced draft apparatus for vessels so equipped, including the air-heating plant, is constructed by the contracting engineers, from complete working drawings supplied, but the

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more vital part of the installation, such as the fans and fan engines, furnace-fronts, etc., are supplied, in every case, by the inventors and patentees themselves, Messrs. James Howden & Co., Scotland street, Glasgow.

LIVERPOOL SHIPPING LETTER.

Liverpool, Jan. 29.—In the British Admiralty Court on Friday, Jan. 19, Mr. Justice Deane gave judgment in the salvage case of the owners of the steamship Lucigen and others, against the owners of the steamship Bremen, cargo and freight, which was a claim for remuneration for salvage service rendered to the Norddeutscher liner Bremen in the North Atlantic in September last. In the course of a voyage from New York to Bremen with cargo and 160 passengers, the Bremen became disabled owing to the breaking of her tail-end shaft. She was picked up by the Lucigen, bound from the Tyne to Philadelphia, and by that vessel towed to Halifax, a distance of 280 miles. The total value of the salved property was $1,197,520. The judge, in giving judgment, said that the Bremen was in such a condition that it was absolutely impossible for her to do anything to restore her power so as to enable her to get to port without assistance. As to the services themselves they were of an ordinary character, but he thought that the vessel was exposed to considerable danger when maneuvering off Halifax waiting for the fog to lift. He should award the plaintiff $25,000, giving $17,500 to the owners of the Lucigen, $2,500 to the master and $5,000 to her crew according to their rating.

The Dominion Government has renewed for five years the British and Canadian mail contract with the Allan Line, with the option of further renewal for a period of five years on conditions that certain improvements in the service are introduced.

Some interesting public tests are being made at the various British ports with a new salt water soap about to be put on the market by Sopon, Ltd., which promises to become shortly an important factor in advancing the efficiency of modern liners. One of the tests included the washing in cold sea water, aboard H. M. S. Asia, of engine-room clothing, pieces of canvas and old hammocks and whatever else was deemed unwashable. To round off the trials, a stoker, with hands blackened with dirt and grease, tried the ordinary naval yellow soap with slight effect, but he succeeded at once in cleaning his hands when he used the new soap. The boon of the invention will be understood when it is stated (1) that the hitherto unsuccessful efforts to produce a satisfactory soap for salt water date from the year 1771; (2) that men aboard torpedo destroyers and kindred small craft, which can only carry enough water for drinking, are often unable to thoroughly wash themselves or clothes for months together; (3) that a liner has to carry about $35,000 worth of napery, and the passengers excessive supplies of linen because a ship lacks one feature as a floating hotel in that she has no laundry; (4) that to distill a gallon of sea water consumes 17 lb. of coal. In order to afford Liverpool shipping men an opportunity of judging the value of this soap for use in a ship's laundry, such, for example, as the almost unique one on the hospital ship Renown, a demonstration has just been made at the Cunard company's laundry in Liverpool, when about 400 tablecloths, serviettes, and towels from a liner were washed in sea water by the new soap. The lather produced and the results attained were pronounced excellent. The many sanitary and economic advantages of being able to preform laundry work at sea needed no exposition to the Cunard's laundry hands. That the laundry bill and the general importance of linen on shipboard is considerable may be gathered from the fact that on many large ocean-going steamers as much as 50,000 to 100,000 pieces of bed and table linen have to be carried because it is essential to have an equipment for the whole voyage. Moreover a considerable collection of dirty linen on a liner, especially when passing through the tropics, must be obvious to all. The experiments have created much interest in shipping circles throughout Britain. In an alternative form, the new soap is applicable to the cleaning of galleys and cooking utensils as well as for washing a greasy deck, floor or ironwork. It is gathered also that the new soap has been tested on some of the Dominion and Leyland liners. It is said to have met with unexpected success, and the importance of its use on such vessels may be gathered from the fact that nearly 5,000 tons of water which are carried on some of the long voyage steamers for cleaning purposes only, will be almost entirely dispensed with by drawing salt water as occasion arises, and using this new soap.

King Edward has decided to launch the new battleship Dreadnought, now building at Portsmouth, on Feb. 6. This vessel will displace 18,500 tons of water, will be twice as powerful, so it is said, as any man-of-war now afloat, and will have a speed of 19 knots. She was begun as recently as Oct. 2 last, and is to be completed for sea within 16 months.

The British Motor Boat Association has decided to hold the annual speed and reliability trials on the Mersey this year, the date fixed being June 8 and 9. In addition to the speed contests there will be a long race for cruisers, and another event will be for motor boats under 25 ft. in length, also a race for dinghys. At the close of these there will be what is sure to prove a most attractive feature of the regatta, the "flying mile." It may be added that after the Liverpool regatta the boats will proceed to Belfast, and thence to the Clyde, and their appearance will doubtless confirm the impression that the motor boat has come to stay.

It is announced this week that the Chesapeake & Ohio, Norfolk & Western and the Southern Railroad Cos. of America have undertaken to ship all their foreign freights from the ports of Newport News and Norfolk by the Furness-Withy Line to Liverpool and London. Sir Christopher Furness has, it is furthermore stated, purchased the interest of the Chesapeake Railway in the Chesapeake & Ohio Steamship Co., and has also purchased the Neptune line of steamers running in connection with the Baltimore & Ohio Railway between Baltimore and Rotterdam.

The British Marine Insurance Companies are just issuing their annual reports. The following having already declared dividends as under: The Sea Insurance Co., 25 per cent for the year, carrying forward a balance of $515,220 to next account; the Reliance Marine Insurance Co., 12½ per cent for the year, carrying forward $168,555 to next account; the Maritime Insurance Co., 10 per cent for the year; the Merchants Marine Insurance Co., 6 per cent for the year; the Union Maritime Insurance Co., 17½ per cent for the year; and the Thames and Mersey Marine Insurance Co., $2 per share, carrying forward $250,000 to the reserve fund.

The second of the new Canadian-Pacific liners Empress of Ireland, is to be launched by the Fairfield Ship Building Co., Jan. 27. The new steamers will provide very keen competition for the Allan Line, the keenest it has yet experienced, but there is no likelihood of any war on rates. It will rather be a competition in the way of providing the best possible accommodation and the highest practicable speed. Of course Allan turbine liners, will always have a certain attraction that ordinary vessels are without, but judging from the work that is being put into the first C. P. R. boat at Fairfield, the two railway steamers will be very hard to beat in luxuriance of accommodation. There is no definite word yet of the additional Allan turbine steamers which were spoken of recently although it is generally understood that they are coming in due time.

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THE MARINE REVIEW

DEVOTED TO EVERYTHING AND EVERY INTEREST CONNECTED OR ASSOCIATED WITH MARINE MATTERS ON THE FACE OF THE EARTH.

Published every Thursday by

The Penton Publishing Company

CLEVELAND.

CHICAGO: MONADNOCK BUILDING.
PITTSBURG: PARK BUILDING.
NEW YORK: 150 NASSAU STREET.

Correspondence on Marine Engineering, Ship Building and Shipping Subjects Solicited.

Subscription, $3.00 per annum. To Foreign Countries, $4.50. Subscribers can have addresses changed at will.

Change of advertising copy must reach this office on Thursday preceding date of publication.

The Cleveland News Co. will supply the trade with the MARINE REVIEW through the regular channels of the American News Co.

European Agents, The International News Company, Breams Building, Chancery Lane, London, E. C. England.

Entered at the Post Office at Cleveland, Ohio, as Second Class Matter.

FEBRUARY 8, 1906.

PRINTED IN AN OPEN SHOP.

AN ANALYSIS OF SENATOR MALLORY'S SPEECH.

More attention is being given in the senate of the United States at this time to the shipping bill than to any other pending measure. It is a bill introduced by Senator Gallinger, chairman of the Merchant Marine Commission appointed by congress to investigate the subject of our shipping. Its provisions are approved by the entire commission, consisting of six Republicans and four Democrats, except as to one provision—the one that provides a bounty of $5 per gross ton per annum to cargo as distinct from mail carrying vessels. On every other feature of this measure the entire commission is unanimous. But the Democrats are by no means united in their opposition to the one feature specified; there is reason to believe that the minority is evenly divided on that point. This indicates how near to complete agreement the commission is, and should be indicative of where the congress will eventually stand in voting on the bill. The commission has made two reports, and the minority has made one, that of a year ago. The bills are referred, in the senate to the commerce committee, and in the house to the merchant marine and fisheries committee. While the minority members of the commission have made no minority report this year, the minority members of the senate committee on commerce have made a report. They made a report last year. The minority report of this year is different from that of last, in that the last one advocates no alternative policy, the minority report of last year advocating a much abridged form of the old discriminating duty policy.

* * * * *

Senator Mallory is credited, and we believe correctly, with having written all of the minority reports but one, that one being the house merchant marine and fisheries committee minority report of last year. The other three, as we say, were written by Senator Mallory. Since writing his last minority report, for the commerce committee of the senate, which was signed by but four of the six Democratic members of that committee, Senator Mallory has made an extended speech in the senate in opposition to the bill. In his speech Senator Mallory advocates the old discriminating duty policy without abridgement—that is to say, in all of its early vigor. The query naturally arises, if Senator Mallory believes, as he undoubtedly does, in applying the old discriminating duty policy without abridgement, did he recommend abridgement in his minority reports of a year ago in order to secure the assent of the other minority members? The query also properly arises, if he believed, when he wrote the last minority report, in an unimpaired discriminating duty policy, why did his report not advocate it? Was it omitted because his colleagues in the minority would not concur with his own views as to policy? These queries are not made in a spirit of banter, but to suggest that there is a considerable diversity of opinion as to policy among the minority members of the senate commerce committee, which could not be united in a mere recital of objections to the bill, and least of all in advocacy of a fixed policy. If this conclusion be a correct one, then it should receive the very careful consideration of the majority members of the senate commerce committee. Likewise, the surmises herein indulged in should be exploited by some senator upon the floor of the senate, in order that the real facts may be laid bare, and for this very pertinent reason: If the minority has no fixed, or united, views as to an alternative policy by which to build up our deep-sea shipping and the majority has, the course of the majority is obvious.

* * * * *

A large part of Senator Mallory's speech is devoted to categorical objections, section by section, to the features of the bill, some of which have since been remedied by amendment or withdrawal, and others of which are merely technical, none of which, as we see them, are important, except those that it

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is our purpose to traverse. The feature of the bill (the second section) to which the senator most strenuously objects, is that which provides $5 per gross ton per annum payment to cargo carriers. He objects to it on constitutional grounds, and he regards it as undemocratic.

In his speech, on this feature of the bill, he says:

In the first place, the amount which is donated is too small.*** Five dollars a ton, in my judgment—and I know it can be demonstrated—for twelve months' service in running a ship of any size is entirely too small an amount to meet the disparity which exists between the operating expenses and the original cost of vessels in the United States and vessels under foreign flags. I do not believe, Mr. President, that $10 would be sufficient to meet that disparity and put the American ship on an equality with the foreign ship.***

Obviously there can be little of "graft," or "robbery," or steal," or "treasury loot," to the American vessel owners, under that provision of the bill. Obviously, too, all that the owner will receive will be disbursed by him to builders, or to masters, officers and crew, and more besides, if Senator Mallory is correct. Therefore, the bill is in the interest of labor, and not in the interest of capital. Invested capital will lose, and labor will gain, if Senator Mallory is correct. This is a fundamental point to be thoroughly digested. Senator Mallory is an admiralty lawyer of extended renown; he is familiar with ships and shipping men; he knows the subject, thoroughly; he was a member of the Merchant Marine Commission; he was a painstaking and keen listener to all that was said; and he has reviewed the printed testimony taken, besides. Some vessel owners say he is mistaken, that the bill is not quite sufficient, in respect to the $5 provision, to meet all of the differences, but near enough to justify them in attempting to build additional tonnage; others say it is just sufficient. The true test will be the operation of the Act, if passed.

* * * * *

Another great feature of the bill is the provision for the establishment of ten new lines of steamships to run to Africa, South and Central America, the West Indies, down the west coast of our hemisphere, and to the Orient, and the speed and frequency of the sailings of the steamships are fixed in the bill, as is the maximum sum that shall be paid to each for carrying the mails. Regarding this feature of the bill, in the course of his speech Senator Mallory said:

But the senator (Mr. Gallinger, of New Hampshire) called my attention to the postal subsidy. I do not find any fault with the postal subsidy. I think it is one of the best features of this bill. The senator knows that I acquiesced readily as a member of the commission. The only fault I ever found with that is I do not think we give postal subsidy enough. I would vote readily to increase the subsidies that are provided for from the Gulf of Mexico, because I doubt very much whether you will establish the lines that are sought to be established to Brazil and Argentina on the small subsidy that is given. * * *

In another portion of his speech he recurs to the $5 per ton feature for cargo, carriers, and says that he cannot see how they will get cargoes, as the subsidy is so small, and he continued:

They do not get enough subsidy to compete with a foreign vessel. Foreign vessels without the subsidy can beat them in the contest. * * *

The two great features of the bill are the provision for mail lines and the provision for cargo carriers. The suggestion has been made in every conceivable way that the bill is a huge raid upon the treasury in the interest of vessel owners and ship builders. On the contrary, the chief opponent of the bill, the man who has had opportunity to make the most extended study of the subject among the minority members of the senate, says that, for the life of him, he cannot understand how Americans will risk their capital under the postal subsidy and the cargo subsidy features of the bill. The probability is that these prospective owners are willing to face an immediate loss, in the hope, through rigid economy in operation, and through reductions in cost of construction due to more steady employment in our ship yards, that eventually they will recover the losses and earn a profit. If Senator Mallory is correct in his ideas, the explanation we have made is the only one that seems reasonable.

* * * * *

A great deal of the opposition to a shipping bill which has arisen has come from free traders, people who believe in the free admission of foreign-built vessels, when owned by Americans, to American registry. The Democrats have coquetted more or less with this plan, but more latterly they have abandoned it, for the reason, probably, that inquiries directed by the Merchant Marine Commission to American owners of vessels under foreign flags, as to whether or not, if permitted by law, they would place them under American register, every reply received was "No!" And another possibly influencing reason is that, if we imported our ships, we would hand over to aliens the employment in the building of them, besides weakening ourselves through the non-possession of ship yards equipped for the construction of ocean-going ships. To depend wholly upon the foreigners for our ships would be an extremely short-sighted, and might prove to be a fatal, policy. So, as stated in the second paragraph of this article, Senator Mallory has become an out and out advocate of discriminating duties. Before reaching the points of the Senator's alternative plan, there is one more quotation to be made from his speech in respect to the mail subsidy feature. On that he further said:

I would be glad to eliminate everything from this bill except the postal subsidy provision, and pass it in that way tomorrow, being under the conviction that it would add a great deal more to our commerce than any other feature of the bill, because of the regularity, the certainty, with which those vessels would come and go.

That his colleagues in the majority—if not some of those in the minority—are willing and anxious to go a step farther than Senator Mallory, and, very moderately indeed subsidize cargo as well as mail carriers, should not become a point of vital difference, nor will it, we believe, be so regarded, when the final vote on the bill is taken.

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We come now to the Senator's alternative plan of discriminating duties. He regards existing treaties, to the number of thirty or more, which bar us from the readoption of that policy as inconsequential, for the reason that they may be abrogated in twelve months' time, any of them. Nor does he fear retaliation and reprisals. On this feature of his speech he says:

> We are told also, with a considerable air of menace, that the countries of the world that we wish to build up trade with, the South American countries particularly, with which we have a very limited trade, when in fact we should have a large trade, are countries whose products come to this country largely on the free list, and in order to avail ourselves of a discriminating duty there we would have to put those articles on the dutiable list.
>
> I have sufficient confidence, Mr. President, in the people of the United States to have no hesitation whatever in believing that they would sustain me in voting to put many of those articles which are now on the free list on the dutiable list if the object to be accomplished is the building up of the merchant marine. It is a patriotic object. It is one which every man who has the welfare and good name and honor and glory of his country at heart will approve; and I have no hesitation at all in committing myself to the principle that if it is necessary, or if it will result in building up the merchant marine of the United States, it is my duty to put on the dutiable list such articles now on the free list as will be necessary to effect that purpose.
>
> Now, I take the article of coffee from Brazil. We import all of that coffee free. The importations amount to 445,489 long tons. At one-tenth cent per pound that would amount to $997,896, which would give the shipmasters an opportunity to get a cargo in Rio Janeiro or in all ports of Brazil at a rate of $2.24 per ton less freight than a foreign competitor. In other words, an American ship with one-tenth cent per pound on coffee would have an advantage over the foreigner on a cargo from Rio Janeiro to the United States of $2,240 per 1,000 tons. * * *
>
> With sugar it is the same. On sugar we pay a duty. We have an average duty on sugar of 1.5 cents per pound, a pretty heavy duty. We import 1,763,338 long tons. At a reduction of one-tenth cent we would have a reduction of $3,949,878, which would allow the same difference exactly at one-tenth of a cent on the 1,000 tons that there is in the case of coffee. That is, an American vessel would be $2,240 better off with a cargo of a thousand tons than a foreign vessel, so far as the ports of the United States are concerned.
>
> Now, take India rubber and gutta-percha unmanufactured. We have 42,238 long tons, valued at $42,214,135. The duty at 2 cents a pound would amount to $1,892,277, which would be divided among American ship owners.
>
> Hides. A large proportion of the hides that come to this country from South America, 188,564,013 pounds, come in free; 83,652,950 come in under 15 per cent duty. The duty on the dutiable hides is $1,621,827. Two per cent duty on the hides now free would be $820,571, a reduction of one-third, or a 5 per cent duty on the dutiable, $540,609, making a saving to the American of $1,361,180 on 131,704 long tons.
>
> Now, there are four items—two of them are dutiable and two of them are free. The total tonnage of those articles would be 2,372,769, and the total difference between the establishd and the discriminating duties would be $8,201,231. I merely cite these as an illustration to show how a direct discriminating duty would work. I am satisfied, Mr. President, that under a wise system of tonnage taxes, we would have no difficulty whatever in providing a return cargo. We would have a cargo from Argentina, Brazil, or Central America; and when it gets to the port of the United States for which it is destined the duty imposed upon tonnage, which has in the past been imposed, would act as a check on foreign competition for outward cargoes. The American merchant marine under such a stimulus would increase and flourish as it did when it led the world, and I doubt very much if more than ten years would elapse before we would have our merchant marine again in the gratifying position it occupied in 1860.
>
> * * * * *

The gross weight of our imports was computed a few years ago by the United States Commissioner of Navigation to be 7,500,000, and they have increased a great deal since that time. Applying the same ratio of discriminating duties to the whole of our imports that Senator Mallory places upon 2,372,769 tons, and it would amount to upwards of $25,000,000 annually. He also advocates discriminating tonnage dues, omitting the amount, but stating the amount "which has in the past been imposed," and which at one time was $2 per gross ton register. On a total of 5,000,000 tons of foreign shipping now engaged in our foreign carrying, there would be an additional $10,000,000 "which," to use Senator Mallory's words, "would be divided among American ship owners." This would total to approximately $35,000,000 annually, on the total of our imports.

No one who reads the remarks of Senator Mallory can for a moment doubt his deep desire to see American shipping built up, and permanently maintained upon the seas, and this without regard to the cost. It is a commendable spirit, and one we wish inspired by all of his colleagues in each branch of Congress, since, it is our profound conviction, it voices the feelings of a vast majority of the American people—the more intelligent and patriotic of our people. Without wishing to disparage in any way the plan suggested by Senator Mallory, it is proper to emphasize its points and its possible scope. We therefore advert to his suggestion that his plan "would act as a check on foreign competition for outward cargoes," and respectfully voice the belief that such a check would be distasteful to our exporters, that it would, while the American tonnage offering was less than demanded, lead to extravagant rates of freight that foreign vessels would be powerless to check, and create disturbance and disorder in our foreign trade. Whether the reductions in duties would attract to the plan the opposition of the powerful interests now protected by existing duties is well worthy of the consideration of every man desiring the early adoption of a comprehensive and effective shipping bill.

* * * * *

With these comments, which might be very greatly, and, from our point of view very interestingly, extended, we will, for the moment leave the subject, trusting that we have done full justice to the chief points in Senator Mallory's speech on the shipping bill, and brought vividly into relief his proposition, with its possibilities of an annual sum of $35,000,000 to be divided among American ship owners, and the very moderate measure that would take an average of $4,000,000 annually for ten years from the national treasury, as proposed by the commission, and as indorsed by a majority of the members of the senate commerce committee. We cannot close our remarks without commending the honesty, fearlessness and perfect candor of Senator Mallory's statements—statements, we feel sure, emanating from so high and so high-minded a source, as to utterly confute and completely answer every demagogic attack upon the Merchant Marine Commission bill, its originators, and its advocates. Senator Mallory has performed a most valuable service for the friends of the bill, for common decency, for fair and just parliamentary debate, and in so boldly declaring and explaining his own magnificent alternative plan—a plan that, when better educated up to the illimitible value of a merchant marine of our own our people may yet be disposed to adopt—he evokes our admiration and commands our profound respect.

Herman Cailsen has been appointed harbor master at Lorain, to succeed Capt. Leon.

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GRAND LODGE OF SHIPMASTERS.

The annual meeting of the Grand Lodge of the Shipmasters' Association, which convened at the rooms of the Buffalo lodge on Jan. 30, continued through the week and though the work done was of a generally routine character there was much that was of general interest. The meeting was called to order by Grand President J. A. Calbick of Chicago, all of the eight subordinate lodges being represented, as follows: Buffalo, George C. Stevenson; Port Huron, A. C. May; Detroit, Murray M. McIntosh; Marine City, George A. Shaw; Milwaukee, A. Christensen; Cleveland, H. F. Kelley; Toledo, E. G. Ashley; Chicago, Robert Young.

Grand Secretary F. B. Higgie of Chicago, received reports from all of the subordinate lodges, all of which appear to be in a flourishing condition and with a good balance in the treasury. This means of course that the grand lodge is well supported and is doing good work. The secretary reported that during the past year seventeen members of the association had died, leaving a total membership of 731. There was $28,384 in the treasury. Since its organization the association has paid out $193,000 in death benefits and as the regular amount is $1,000 this shows the death of 193 members in good standing.

CAPT. W. D. AMES.
GRAND PRESIDENT SHIPMASTERS' ASSOCIATION.

Perhaps the most interesting matter taken up was the question of a home for aged and disabled members, which was brought before the meeing by Past President Alexander Clark of Buffalo in a communication that urged immediate action. In order to assure the members that the idea was considered of vital importance it was proposed to make a contribution to the fund to be raised and give the proceeds from the shipmasters' directory, which is about $4,000 a year.

The plan, so far as developed, is to establish the home at some lake-connecting point, as at Marine City, where the inmates can look out and see the fleet pass by and be able to recognize this or that craft that they have sailed in. It is probable that the wives of inmates will be included and the plan may embrace mates and other leading members of a ship's crew. A working committee from the lodges will be made up to push the matter.

The grand lodge continues in urging the establishment of a steam fog whistle on Colchester reef in place of the bell there at present and a resolution was passed asking that in view of the many lives lost from collisions in St. Clair and Detroit rivers they be put under the same rules as those in operation on the Sault river.

It is a rule of the association not to take up the matter of wages, one captain saying rather dryly that it was held that if a shipmaster was not capable of dealing with his owner in that capacity he was not fit to sail a lake boat.

One reason for the fine condition of the association is said to be on account of the good financing of everything in connection with it and the cutting off of unnecessary expenses. There are few lodges and a single delegate from each, with the officers, makes up the grand lodge. So it is felt that the establishment of a home will not be a very hard task, especially as there are a good many vessel owners in the membership.

The following officers were chosen: By election—W. D. Ames of Cleveland, president; M. M. McIntosh of Detroit, first vice president; H. F. Kelley of Cleveland, second vice president; Thomas Jones of Cleveland, treasurer; F. B. Higgie of Chicago, secretary; by appointment—E. G. Ashley of Toledo, chaplain; A. C. May of Port Huron, marshal; Robert Young of Chicago, warden; Anton Christensen of Milwaukee, sentinel. Toledo was selected for the next meeting.

There were of course a good many other lake captains in attendance unofficially and the rooms of the Buffalo lodge were thronged every day, ladies sometimes also being present. The meeting appears to have been of a most harmonious character and the delegates were pleased to testify to the good feeling existing throughout.

The evening of the 31st was given up to the grand ball at the Ellicott Club, given under the auspices of the local lodge. The attendance was large and the entertainment of the best. Capt. John B. Hall was chairman of the executive committee, with John Perew and Henry Warwick as associates. The entertainment committee was headed by Capt. J. J. Hartman, the floor committee by Capt. Carl Secord, and the reception committee by Capt. George C. Stevenson. There were besides many other reunions on a special plan, all of which went to increase the general enjoyment and spread the feeling of fraternity.

PERSONAL.

Charles T. Fairbairn has been selected to succeed Alex. Maitland as general manager of the Marquette & Mesabi mines of the Republic Iron & Steel Co.

Capt. W. C. Wilkey, of the Tennessee River Navigation Co. has been elected general manager of the Tennessee River Navigation Co., Chattanooga, Tenn.

Warren Johnson has resigned his position as manager of the Johnson Iron Works, New Orleans, and has opened offices as a consulting engineer at New Orleans, La.

Marvin Hughitt has been elected a director of the United States Steel Corporation in place of Marshall Field. Mr. Hughitt is the president of the Chicago & Northwestern Railway Co.

Mr. James A. Wright, who has recently resigned as manager of the passenger business of the International Mercantile Marine Co., in America, was presented with a loving cup from his associates. Mr. Wright resigned to enter the stock exchange firm of Huhn, Edey & Co.

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ITEMS OF GENERAL INTEREST.

The New York Ship Building Co., Camden, N. J., has received an order to build two steel barges for the Consolidation Coal Co., of Baltimore.

Fire which originated in the Union grain elevator in East St. Louis, spread to the freight car yards of the terminal association and caused a loss estimated at $1,000,000.

The new stone dry dock recently completed at the Boston navy yard is now in commission. The courtesy was extended to the White Star line of docking the steamer Romanic in it.

The Wm. Skinner Ship Building & Dry Dock Co., Baltimore, Md., launched last week an open cargo lighter for the Baltimore & Ohio Railway Co. It is 80 ft. long, 28 ft. beam and 8 ft. deep.

The Gas Engine & Power Co., and Charles L. Seabury & Co., Consolidated, Morris Heights, New York, has received an order from F. C. Havens, of San Francisco, Cal., for an 84 ft. power boat to be driven by two 80 H. P. motors.

A 15 H. P. boat, 32 ft. long, supplied with twin propellers has been added to the equipment of the life saving station at Fire island. If the boat proves to be a success, similar craft will probably be added to the equipment of other life-saving stations.

The business of Elisha Webb, Jr., trading under the firm name of Elisha Webb & Son, carried on at the northeast corner of Water and Chestnut streets, Philadelphia, has been incorporated under the name of Elisha Webb & Son Co. Mr. Webb will continue with the company as its president and general manager.

J. H. Darling, of the United States engineer corps, has made careful examination of the north pier at Duluth, to ascertain what damage was inflicted by the steamers that struck it during the November gale. He found that the steamer Mataafa, which collided with the pier head on had done no damage to the structure on the water.

The Coen Vessel Co., 117 West 104th street, New York, has contracted with G. W. Kurtz and associates, of Toledo, to build two twin-screw excursion boats for the Maumee river service to be ready this summer. The boats are to be constructed of steel 130 ft. long, 24 ft. wide and 16 in. draught. They will have compound engines and water-tube boilers.

At the annual meeting of the Association of Masters and Pilots of Steam Vessels at Washington last week, the following officers were elected: J. C. Silva, Boston, president; M. L. Cullom, Camden, N. J., first vice president; Wm. McFarlane, San Francisco, second vice president; A. R. Mackey, Pittsburg, third vice president; B. F. Perkins, Camden, N. J., secretary; L. B. Dow, Brooklyn, treasurer.

The towing of the large side wheel steamer Olympia, by the steamship Zealandia, from San Francisco to New York will prove a record breaker. The trip is one of the longest ever undertaken by a vessel with a tow as large as the Olympia, and it will be unusual because of the fact that the Zealandia will make the passage around the Horn, making only one stop on the protracted voyage.

A specially constructed tow line has been made which is one half a mile in length, of strong steel wire. The Zealandia will also carry extra hawsers in case the steel tow line should part. Capt. Roberts, of the Zealandia, expects to make the voyage to New York in eighty days. The steamer will carry 3,000 tons of coal, and will put in at Point Arenas to report.

A number of alterations have been made in the steamers City of Cleveland and City of Detroit of the Detroit & Cleveland Navigation Co.'s fleet. It is expected to put those steamers in operation at the earliest possible moment. Mr. A. A. Schantz, general superintendent of the company, hoped to put the City of Detroit in commission on Feb. 15 but the change of weather will probably delay this date.

Hon. T. E. Burton, chairman of the committee on rivers and harbors of the house of representatives has introduced a resolution in the house looking to the preservation of Niagara Falls. The International Waterways Commission is instructed in the resolution to report to congress what action is necessary to prevent further depletion of the water flowing over Niagara Falls in order to preserve the falls in their natural condition.

The Baltimore Steam Packet Co., Baltimore, Md., commonly known as the Old Bay Line, has made plans for another steamer to be added to their fleet plying between Baltimore and Norfolk. The new vessel will be schooner-rigged with two masts, and will be 333 ft. 8 in. long, 33 ft. beam and 22 ft. 6 in. deep. The propelling power will consist of a triple-expansion engine, supplied with steam from two Scotch boilers.

Announcement has been made that the United States Transportation Co. will appoint the following captains to the vessels of its fleet, but have not as yet assigned them to the boats: Ralph J. Lyons, E. K. Rattray, J. H. Driscoll, C. Z. Montague, Frank Boyer, Harvey L. Mills, George W. Pierce, Sidney Lebeau, C. D. Woodward, A. W. Stalker, Alex. Forbes, F. H. Reid, Wm. H. Blattner, Wm. McAlpine and F. C. Folsom.

The Ocean Steamship Co., of Savannah, has placed an order for the construction of a new ship with Roach's Ship Yard, Chester, Pa., The new steamer will be 396 ft. over all, 370 ft. keel, 49 ft. beam and 35 ft. deep. She will register 6,000 tons gross and will have accommodations for 120 first class, 36 intermediate and 66 steerage passengers. It is intended to make her the finest vessel in the coastwise service plying out of New York.

In his testimony before the senate interoceanic canal committee this week, Mr. John F. Wallace, formerly chief engineer of the Isthmian canal commission, declared that he had resigned his office because of Wm. Nelson Cromwell's relations to the project. He felt that while Cromwell had no official status in canal management everyone was subordinate to him in that he had the president's ear. Mr. Wallace charges Cromwell with having promoted the revolution in Panama.

From designs by Henry J. Gielow, of New York, a new passenger boat has just been built for the Bay Road Construction Co., for use on Oneida lake. The steamer is 98 ft. over all, 88 ft. 9 in. keel, 22 ft. 3 in. beam, and 7 ft. deep. She is propelled by a surface-condensing engine 14 and 28 in. cylinder diameters by 18 in. stroke, built by the Morris Machine Works, Baldwinsville, N. Y. Steam is supplied by a safety water-tube boiler 90 ft. long 9 ft. wide, 6 ft. 5 in. high and allowed 250 lbs. steam pressure.

The Sharptown Marine Railway Co. has received contract to build a four-masted schooner for Capt. E. G. Bennett, of Sharptown. The vessel will be 150 ft. long, 34 ft. beam and 12 ft. deep. She will be built of white oak and Georgia pine, and her auxiliary equipment will include a 12 H. P. gasoline engine for hoisting sails and anchors. The schooner when completed will be managed by S. J. Cooper & Son of Sharptown. The Sharptown Marine Railway Co. is also building two barges 175 ft. long, 30 ft. beam and 13 ft. deep for the P. Dougherty Co., of Baltimore.

The annual meeting of the Pittsburg Coal Co., and its subsidiary company, the Monongahela River Consolidated

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Coal & Coke Co., will be held at Jersey City, N. J., on Saturday of this week and it is understood President Francis L. Robbins, president of both companies will retire from that position and will be succeeded by M. L. Taylor, of Erie, Pa. Mr. Robbins will, however, retain the chairmanship of the board of directors. Other changes, which have been intimated but not officially announced will be made, these concerning the position of second vice president and general sales manager.

The Amethyst and Topaz, British torpedo-boat destroyers, were constructed after the same pattern, and selected by the Admiralty for the purpose of making a series of exhaustive tests; the former was equipped with turbines and the latter with reciprocating engines. The contract speed of the vessels was 21¾ knots and the tests showed that at all speeds above 14½ knots the turbine-equipped Amethyst was more economical, namely, 15 per cent at 18 knots, 31 per cent at 20½ knots and 36 per cent at 21 1-10 knots. At full power in each vessel the Amethyst showed 42 per cent more than required by contract on the coal allowed. The Amethyst also reached a speed of 23.5 knots during these tests and the Topaz only 22.1 knots.

Secretary Metcalf of the department of commerce and labor has ordered a thorough and searching investigation of the weck of the Valencia, off Vancouver island, and of the conduct of the officers and the crew of that steamship, as well as that of the officers of the steamers Topeka and Queen, which went to the assistance of the wrecked vessel. The secretary's action is based on the information received by him that the investigation should be ordered at once. When the report is received, it will be turned over to a special commission consisting of Assistant Secretary Murray, Supervising Inspector General Uhler and Herbert Knox Smith, deputy commissioner of corporations. These were the officers who investigated the Slocum disaster.

SHIP FOR 1907 DELIVERY.

The ship builders of the great lakes are certainly enjoying an era of prosperity such as they have never known before. As though it were not enough that orders should have been placed to fill the berths for the season of 1906, orders are now being placed for vessels for 1907 delivery. The American Ship Building Co. received three such orders last week from the Weston Transit Co., of Tonawanda, of which Charles A. Weston is president, L. S. De Graf vice president and W. M. Mills, treasurer and general manager. These three steamers have the present distinction of being the largest ever ordered. They will be 605 ft. over all, 585 ft. keel, 60 ft. beam and 32 ft. deep. Their beam will prevent them utilizing the Canadian canal at Sault Ste. Marie. They will have thirty-six hatches spaced 12-ft. centers. Their engines will be triple-expansion with cylinders 24, 39 and 65 in. diameters by 42 in. stroke, supplied with steam from two Scotch boilers 15 ft. 4½ in. diameter and 11 ft. 6 in. long, allowed 200 lbs. pressure with Morrison suspension furnaces and Ellis & Eaves draft. They will carry about 13,000 gross tons on 19 ft. draught and they are promised for delivery on April 1, 1907. The company ordering these steamers is closely associated with the Tonawanda Iron & Steel Co., of Tonawanda, N. Y.

The American Ship Building Co. also closed contract with Chicago and Milwaukee parties represented by Capt. D. Sullivan, of Chicago, for a freighter for 1907 delivery to be 440 ft. over all, 420 ft. keel, 52 ft. beam and 28 ft. deep. She will have triple-expansion engines, with cylinders 22, 35, and 58 in. diameters by 40 in. stroke, supplied with steam from two Scotch boilers, 13 ft. 9 in. diameter and 11½ ft. long, fitted wth Ellis & Eaves draft. She will carry 7,500 tons of ore.

FREIGHT SITUATION.

It is announced that the United States Steel Corporation has covered its ore requirements for 1906, though no additional chartering has taken place since the beginning of the year. The Steel Corporation will not announce how much vessel tonnage it has chartered though it was understood at the beginning of the year that 9,000,000 tons were covered. In addition to its own fleet the Steel Corporation will furnish cargoes for the vessels of the Provident Steamship Co. which comprises the steamers James H. Hoyt, D. G. Kerr, J. H. Reed and D. M. Clemson. These four steamers could carry in a season about 600,000 tons of ore. The Steel Corporation has four 600-footers now building, but will not have the full use of them during the coming season, as they will not be ready so that 13,000,000 tons is an outside estimate of what it will be able to carry in its own vessels during the year, including the vessels of the Provident Steamship Co. The likelihood is that the fleet cannot move 13,000,000 tons. If the Steel Corporation is, therefore, to maintain its proportion of the total movement during the season of 1906 it has chartered approximately 7,000,000 vessel tonnage.

Chartering of vessels to hold coal is quite brisk, but coal rates have not yet been fixed. Shippers are endeavoring to forestall the effects of the coal strike, should the miners declare it, by hurrying coal to the Lake Erie docks and putting it aboard. Interests which do not usually carry coal, such as the Steel Corporation and the Cleveland Cliffs Iron Co. are doing some figuring with coal shippers for the first trip.

The board of managers of the Lumber Carriers' Association in session at Detroit this week, established rates on lumber on the basis of $2.50 per 1,000 ft. from the head of Lake Superior for the coming season. This is 25 cents above the freight rate of last year. The question of apportioning the tonnage among the carriers evidently was not settled, but will be taken up later. The plan proposed is to place the matter in the hands of a chartering committee if 75 per cent of the tonnage enrolled in the association are in favor of it.

TURBINE BATTLESHIPS.

The invitation for bids for the construction of the two new battleships authorized at the last session of Congress will permit bidders to send in, as usual, their own designs, while asking for proposals on the departmental plans. In the class of bids based on the private designs there will be opportunity for offering to build one of the battleships with turbine machinery instead of reciprocating engines. This decision has practically been reached by the board of construction as the result of a thorough investigation of the subject, and the observation of practical tests, including those recently conducted at South Brooklyn and in course of trips on turbine trans-Atlantic liners. This is a notable departure from the usual designs for naval machinery, and marks a distinct step in the advancement of the mechanism of naval vessels. It is possible that the speed of the different classes of ships will in time be materially increased by this new mechanism, although the naval engineers are not claiming too much in any direction, and are not certain that the turbine system will furnish what is known as economical speed.

The Detroit Trust Co. will shortly float an issue of $150,000 worth of bonds for the steamer Abraham Stearn building for the Commonwealth Steamship Co. of Cleveland.

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HOW OVERSEA SHIPMENTS ARE PACKED.

In the following report Special Agent Crist, writing from Tientsin, the great commercial depot of north China, describes at length the manner in which goods are packed in this country, how received at their destination, and furnishes illustrations which give emphasis to his description, and which can not fail to convince American manufacturers and exporters of their deficiencies in this particular as well as impress the general reader with the correctness and the forcefulness of charges that have been so frequently made and reiterated by our consuls and agents relative to American methods in dealing in foreign markets.

FIG. 1.—CASE GOODS. WOODEN CASE DESTROYED IN TRANSIT, TIN LINING PARTIALLY DESTROYED.

FIG. 2.—CASE GOODS SHOWIN

There is probably no one thing to which American exporters can give their attention that would bring better returns than that of packing. As a general proposition the wood of which they construct their cases is too light in weight. Where one-half-inch stuff is required they will use three-eighths. If 1-inch stuff will insure safe delivery English and German exporters use that thickness, while many Americans select a three-quarters or seven-eighths thickness. Two cases in point have been brought to my attention within the past few days which showed that the utmost thought, attention, and care had been expended upon the details of packing, but with an evident lack of complete understanding of the strain to which breakable goods are subjected in transit to this market. In one instance, by a slight oversight, an automatic piano player barely escaped complete destruction.

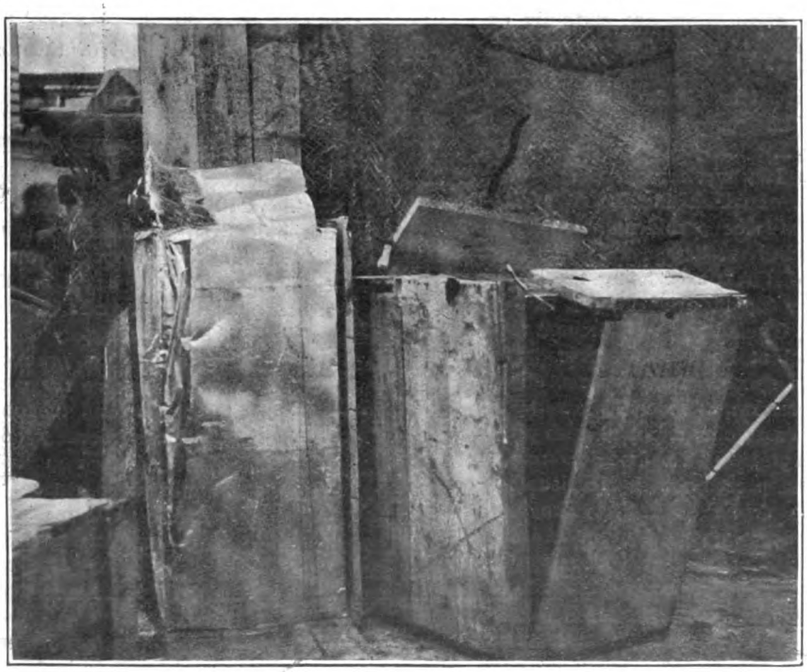

FIG. 4.—CASE GOODS. CONDITION UPON ARRIVAL.

FIG. 5.—CASE GOODS AN

The first instance was that of a shipment from a western manufacturer of window glass. This lot comprised eight packages of opaque or figured window glass in wooden boxes. From the invoice there had been, apparently, 80 sheets of glass placed in flat boxes, each box

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containing 10 sheets. These boxes, or cases, were constructed of three-eighths wood on the sides and five-eighths-inch on the ends. The wood was entirely too light in weight and, being of soft pine, was subject to fracture on very slight jar or strain. The sheets of glass were evidently laid in the boxes with loose hay. Hay might have been sufficient if it had been securely woven about each separate sheet of glass. Each box was then carefully wrapped in more hay and the whole encased in a gunny sack.

DITION UPON ARRIVAL.

FIG. 3.—CASE GOODS. CONDITION UPON ARRIVAL.

S OF AMERICAN GRAYS.

FIG. 6.—JAPANESE YARNS. CONDITION UPON ARRIVAL.

There was no marking upon the sacks to indicate their contents, and upon ordinary examination they appeared to contain only hay, straw, or other indestructible merchandise. The covering of hay was not thick enough to shield the sides of the boxes from blows and knocks, but thick enough to disguise the presence of the box, and having no strength to sustain weights independent of the slight support given by the fragile box it would have been far better if there had been no such covering and the boxes had been shipped bare, with the cautionary signs usual in shipments of glass or other fragile commodities. Had this been done the boxes would have been stowed in places on shipboard to insure their safety. Instead of that in all likelihood they were placed with other baled and sacked cargo, and from the appearance of the glass it was quite apparent other sacks had been placed on top of them. Under the most favorable conditions these boxes could not have withstood the weight of a single bale of piece goods, and if several thousand pounds of flour sacks should have been loaded after the eight sacks of glass had been placed in the ship's hold the weight would have completely crushed them. At any stage of the transit these goods were liable to destruction, and it is impossible to state at what stage they were destroyed. Upon opening two of the sacks the boxes were found crushed and the contents utterly destroyed. There was not a piece of glass left larger than possibly 8 or 9 inches in length, with jagged edges, and varying from one inch to four or five inches in its greatest width.

The other instance to which reference is made is a "piano player" from an eastern manufacturer. This ma-

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chine was carefully and superbly packed in all save one or two details. There should have been placed inside of the piano-player case two blocks of wood, one at each

FIG. 7.—AMERICAN PIECE GOODS METAL BOUND, ONE BALE TIED WITH ROPE.

end of the main horizontal piece, which appears to sustain the mechanism of the player, so as to securely support the uprights at its ends and prevent any lateral play. These uprights are of light stuff, sufficiently strong to answer the purpose for which they are meant, but entirely inadequate to withstand any unusual side wrench or strain to which every machine is liable in combined rail and ocean transit. This was one of an order for two players. One was consigned to Peking and arrived in good condition. If this ratio should hold in a larger shipment it would prove so great a financial loss as to cause a discontinuance of further orders.

The upper portion of the right side of the cover was split off entirely, and the middle section of the cover was broken in two pieces. The upright end support on the right-hand side was splintered, the cast-iron arms connecting the bellows and pedals were snapped off, all attachments which were held in place by small screws were torn loose, the small brass angles at the sides of the middle section which contains the music spindle were bent and broken loose, a piece was chipped out of the flange on the right-hand end of the roller, and the iron ⊢⊣ shaped casting was broken at the point indicated by the dotted line. This casting carries the shaft, which was badly bent, by which the roller is moved. Besides these injuries, the right-hand door was jammed back and caught upon some obstruction which dug into its surface, and the wooden guide to the hammers was broken into five or six pieces.

This situation can be avoided in the future by removing the pedals and placing them in a separately constructed compartment nailed in some suitable place inside of the packing case. To prevent lateral motion of the mechanical parts two blocks of wood could be properly fitted snugly into the spaces between the casing and the upright supports to the cross piece carrying the operating parts of the player.

English underwear, haberdashery, and miscellaneous articles of clothing are packed for shipment in boxes or cases of seven-eighths-inch stuff, having tin linings made to the exact inside measurement of the box. Inside of the tin lining heavy wrapping paper is placed, in which are packed the bundles of different articles. These articles are wrapped in attractive paper packages or in pasteboard boxes containing one-half dozen each of such articles as hosiery, gloves, etc. Each package is properly marked, giving clearly and plainly the number, size, and name of the contents.

Cases containing an assortment of different articles have the different kinds packed in boxes having distinctive color marking, as white, blue, green, black, red, denoting socks, stockings, and underwear of different qualities, or they may be distinguished by being decorated with cheap but attractive lithographs. This facilitates the examination by the customs officials. An examination of one case of goods packed in this manner is sufficient to pass the entire shipment. When the case is packed by

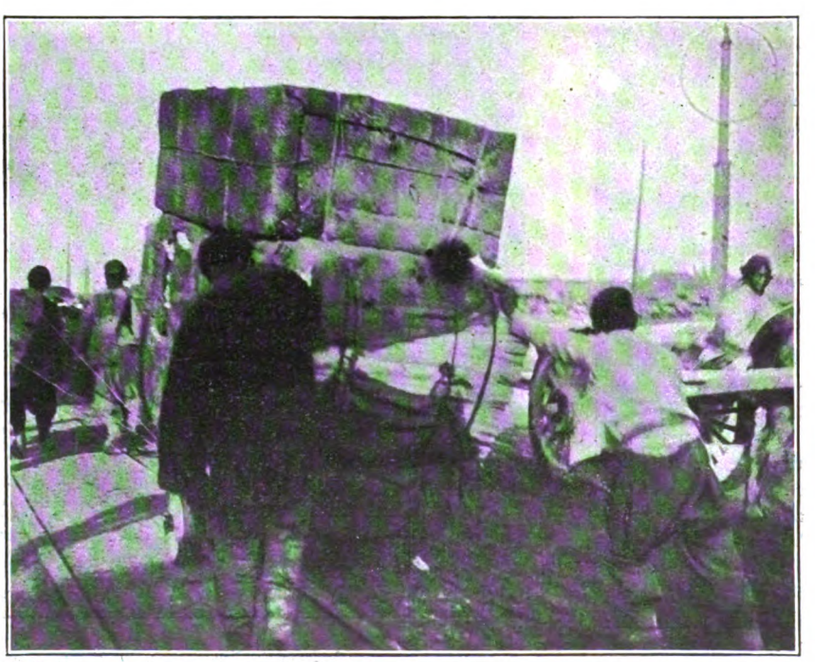

FIG. 8.—AMERICAN PIECE GOODS AND NATIVE GOODS EN ROUTE TO THE CHINESE OWNER.

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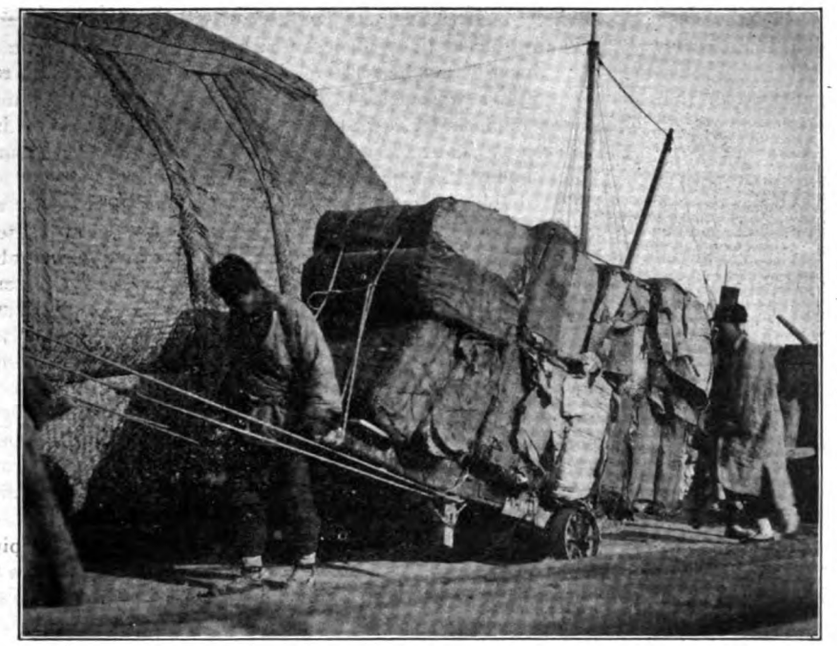

FIG. 9.—TRUSSES OF AMERICAN PIECE GOODS IN DAMAGED CONDITION.

the exporter at the point of shipment, the top of the tin lining is securely soldered, so as to be water-tight. That this is a most necessary precaution in all shipments other than gray goods is evident upon examination of shipments of goods arriving daily with their battered and crushed cases. In many instances only the tin case is left intact upon arrival, and this is frequently so damaged as to expose the goods to the elements. The most careful packing is not always able to withstand the rough treatment given by the coolies who load and discharge the cargoes at these ports.

Photographs of some samples of tin-lined wooden cases are herewith forwarded. These pictures are not exceptional samples, but are of cases which had evidently been made and the goods packed by men deemed competent for the work. They happened to receive a greater portion of smashing, tumbling, and crashing than the others of the same kind containing like goods, and as a result succumbed in the degree shown by the photographs.

No. 1 presents a view of the tin-lined case partially destroyed and the only remaining protection to the contents. The wooden outer case was destroyed in transit.

Nos. 2 to 5 show the damaged condition in which many wooden tin-lined cases arrive in this port. All of the photographs were taken on the river landing before the goods had been received by their purchasers and presented this appearance before passing through the final one or two handlings to which they are still to be subjected.

The addresses upon bales and boxes arriving from Europe and England are in large bold-faced type, and the cases seldom exceed 5 feet in length or breadth. The boxes are bound with heavy strap-iron binding on their edges, while the ends are doubly supported by cleats with short strap irons fastened to the ends and running over the edges to the sides. The iron straps on packages arriving from America in many instances appear to have seen service in previous shipments. This increases the liability to breakage and the practice is to be deprecated. The German method of packing goods similar to those alluded to differs from the English only in that they use oiled-paper lining to the tin box instead of plain paper.

The photographs Nos. 6 to 11, inclusive, indicate the condition of various baled goods from different countries upon their arrival at Tientsin. These pictures were taken as the bales were seen upon the customs landing, and are in each instance described to illustrate a particular point of comparison.

No. 6. Japanese yarns in bales of 400 pounds net. The markings upon these bales always show up clear and distinct, both in Chinese characters and English. The iron straps are heavy and broad and the angles of the bales are supported by stout boards or sections of bamboo poles, giving greater protection to the contents in transit. Bales thus prepared are not often broken in coming to this port, the percentage being quite small.

No. 7. American bales of piece goods, bound by metal bands, which arrived in good condition with but slight abrasion and tearing, and a rope-bound bale, with but two ropes remaining out of the original nine. This bale will arrive at its destination without further damage, but the goods are in an unprotected state and require careful handling.

No. 8. American piece goods en route to the godown of the Chinese purchaser, showing method of trucking, and the large loads hauled by Chinese coolies.

No. 9. There are eight trusses of goods in a more or less dilapidated condition. This is a typical load, illustrating the average condition of the American truss. In al-

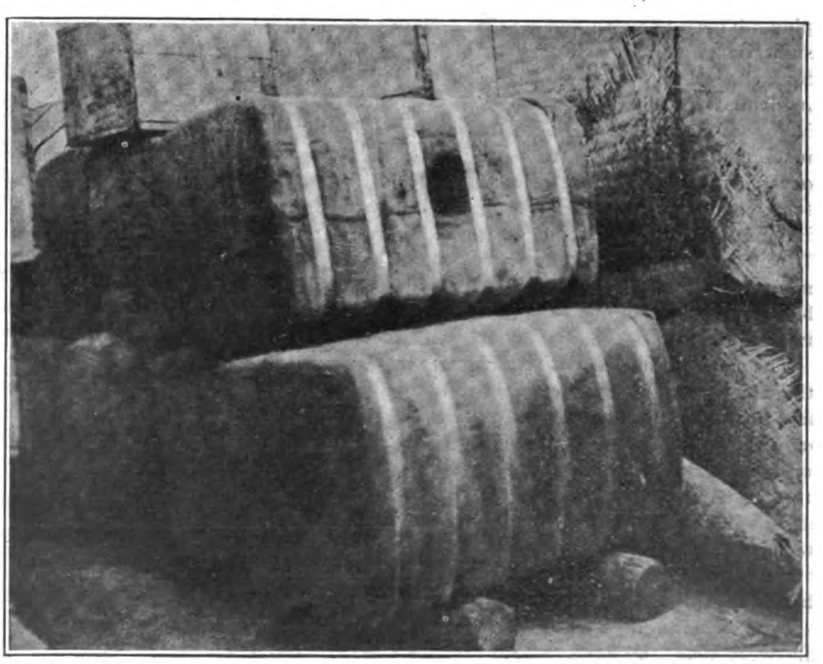

FIG. 10.—BALES OF PIECE GOODS FROM HOLLAND.

most every instance the ropes have all been removed, and if three of the iron straps remain which bind the two bales that is looked upon as a favorable shipment.

No. 10. Bales of piece goods arriving from Holland.

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The heavy iron straps insure in most instances arrival in good condition.

At the time of the exposure the bund was literally strewn with damaged bales of American piece goods. There must have been at the lowest estimate 500 in the immediate range of vision and the greater part were torn, soiled, and in bad shape generally. Those in the best condition were bound with iron straps, while the rope-tied bales suffered the most.

A second letter describing condition in which piece goods shipped from the United States arrive in China is furnished by Special Agent Crist. A number of photographs were obtained which add to the value of the special agent's descriptions. His report follows:

Much of the American piece goods comes in machine-pressed bales, bound with eight, nine, or ten ropes. Other countries use iron bands with buckles or locked ends. There are so many disadvantages and apparently no advantage save that of cheapness in the use of ropes, which are considered most undesirable by those engaged in foreign trade at this port. The principal disadvantage is that the goods arrive in such damaged condition as to at once place them at a higher price, allowing for consequent loss, than similar goods better packed. The allowance of claims for damaged cloth is a constant element in importing American baled goods, which does not figure prominently in the calculation of the prices of goods from other countries.

In looking over the stock of piece goods in a godown in Tientsin, which represented between 500 and 800 bales from different countries, it was found that about 60 per cent of them were American product. In the course of their shipment and transshipment, from three to eight, and in many instances all, of the ropes had been removed from fully 80 per cent of the bales in sight, with the result that from the consequent bursting the contents had become soiled through contact with dirt and mud. Much of the goods had been damaged through abrasion and tearing from exposure. This condition was the basis for a claim for discount by the Chinese merchant, which has to be entertained; and as no claim can be collected from the shipping company, the loss has to be sustained by the commission house. Baling with ropes is considered inadequate protection to the goods, and does not admit of reimbursement for damages sustained. Some American manufacturers have adopted the metal strap baling system, the best and only appropriate method of baling goods for this market. There is a light-weight metal band used by some American mills which is better than any in use. It appears to be made of malleable or wrought iron, is very strong in tensile strength, but is easily torn by the hands if started by a small cut on the side.

The metal does not rust by contact with water or dampness, as do ordinary iron straps. Rust frequently stains the goods. One expedient adopted by shippers is to coat both sides of the bands with either black or red paint, which materially reduces the liability to rust. All Indian bales are bound with iron straps having a covering of heavy red paint, as the vicissitudes of these goods are many, four months often elapsing between the time of shipment and arrival at this port from India; the course of the goods often requiring four transshipments.

English baled goods in most instances have as an added protection from abrasion a piece of tarred gunny cloth wrapped about the joint formed by the fastening of the ends. This materially reduces damage from that source.

PROSPECTS OF THE ELASTIC FLUID TURBINE.

An interesting paper on "The Evolution and Prospects of the Elastic Fluid Turbine," was read at the meeting of the Institute of Engineers and Ship Builders in Scotland, held in Glasgow on December 20, by R. M. Neilson, of Manchester, Mr. Neilson said the efficiency of large steam turbines built for driving electric generators had been brought so high during the last few years that there was little chance of the present records for low steam consumption being lowered in the near future to any great extent. The elastic turbine was, however, in his opinion by no means so perfect or so adaptable as it might reasonably be hoped that it would be in the near future. With regard to the propulsion of ships by marine steam turbines, wonderful progress had been made during the last ten years, but there was still room for improvement in the steam turbine screw-propeller combination, especially with respect to small, slow vessels. There was also room for improvement as regarded reversing. For many purposes the speeds of rotation which it had been found necessary to give steam turbines, especially those of smaller power, had been a serious objection to their use. Moreover, the serious falling off in the efficiency of turbines when run with a poor vacuum, and the still greater drop in their efficiency when run non-condensing, had in many cases prevented their adoption. Steam, although convenient, was not the only possible elastic fluid for a turbine; and the much greater ranges of temperature with the same range of pressure obtainable by the employment of other fluids, instead of or in conjunction with steam, deserved serious consideration. He was certain that turbines actuated by some elastic fluid would form a very large percentage of the prime movers employed during the next fifty years. This prophecy was made with a good knowledge of the success that had been achieved with gas producers and large reciprocating gas engines and with a belief that the advantages of steam turbines had often been over rated and it was not made from any special feeling of attachment to turbines, but from a careful weighing of the advantages and disadvantages of reciprocating and other machinery. In the course of a brief discussion which followed, Professor Jamieson referred to the difficulty of obtaining reliable information as to the working of turbines.

WHAT THE POWERS ARE DOING.

The most interesting feature of the ship building projects of the great naval powers for the coming year is the increasing size of the battleships. The two battleships launched by Great Britain this year, the Africa and the Hibernia, were of 16,350 tons, and these were larger than those launched by any other power. The prevailing size of next year's battleships will be 18,000 tons. Great Britain is building an experimental example in the Dreadnought. Other powers are following suit, although their vessels are still in the air. The United States Naval Construction Board is about to submit plans to congress for a new type of 18,000-ton battleship; the Russian naval program provides for six ships of the same burden; France talks about laying down three 18,000-ton monsters, and Japan two; while Germany hopes for six. To descend from ships in the air to ships in the water, Great Britain launched during the year two battleships and four armored cruisers; France launched one battleship and one armored cruiser; Germany two battleships; Russia one battleship; Italy a battleship and an armored cruiser; Japan two battleships and one armored cruiser; and the United States four battleships and one armored cruiser. In the list of vessels completed and put into service, Great Britain comes first with a record of five battleships and four armored cruisers, against five battleships by the United States, two battleships and two cruisers by Germany, and one armored cruiser each by France and Italy. Of all the naval powers, Italy alone still pins her faith to the small mobile type of battleship.

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LAUNCHING THE DREADNOUGHT.

The launch of the battleship Dreadnought, the largest and most powerful man-of-war ever constructed, on Feb. 10 directs attention to a great achievement. When ready for sea this vessel will displace 18,500 tons, but her size is the least remarkable feature. The details of the Dreadnought's construction still remain a secret. The Dreadnought is an embodiment of the lessons of the late war in the far east. The Japanese permitted no other power to witness the great sea engagements except Great Britain. That country had attaches watching and noting all that took place, and their conclusions were submitted to a special committee, on which sat not only the most experienced naval officers, but the Director of Naval Construction, Lord Kelvin, and a number of leading private ship builders. The Dreadnought is the outcome of their deliberations.

Some particulars of the armament of this battleship can be indicated. In the past British vessels have carried four 12-in. guns (850-lb. shell); the Dreadnought will have ten of these weapons of a new type, with a muzzle energy of 49,568, as compared with the 33,622 of the guns carried in as recent battleships as the Majestics, an increase of power in each weapon of 50 per cent. In a great sea fight the magnificent ship which the King is about to christen will be able to discharge every minute ten projectiles, weighing 8,500 lbs., with sufficient velocity to send them about 25 miles, or to penetrate about 16 ins. of the hardest armor at a range of two miles. Unlike all British and foreign battleships built in the past thirty years, the newest addition to the fleet will carry no weapon smaller than the great 12-in. piece, except eighteen 3-in. quickfirers for repelling attacks by torpedo craft. She will mount neither 9.2-in., 7.5-in., nor 6-in.; she will be the biggest ship afloat, and she will have only the biggest and most powerful guns. The war in the far east revealed the comparative uselessness of the gun of medium size at modern battle ranges.

Colonel Cuniberti, the chief constructor of the Italian navy, anticipated this verdict of the war in an article which he contributed in 1903 to Jane's "All the World's Fighting Ships." He then advocated the construction of a vessel with twelve (instead of ten) 12-in. guns, and thick armor, and he justified his advice in these words:—

"Such a ship could fight without throwing away a single shot, without wasting ammunition; secure in her exuberant protection, with her twelve guns ready, she would swiftly descend on her adversary and pour in a terrible converging fire at the belt.

"Having disposed of her first antagonist she would at once proceed to attack another, and almost untouched, to despatch yet another, not throwing away a single round of her ammunition, but utilizing all for sure and deadly shots. A large and abundant supply of ammunition can be provided.

We must come to the conclusion that the type of vessel will not be absolutely supreme and worthy of such a nation (Great Britain) unless we furnish it with such a speed that it can overtake any of the enemy's battleships and oblige them to fight.

TRIUMPH OF THE TURBINE.

The Dreadnought will cost 10 per cent per ton less than recent battleships British built, although she will represent the last word in all details of her construction, and warships are built in England far cheaper than abroad.

In another respect the Dreadnought will be unique. She will be the first battleship in the world to be driven by turbines, and since the success of the Hon. Charles A. Parsons' invention was demonstrated so conspicuously by the Cunarder Carmania, the courage evinced by the Admiralty in making this bold departure will occasion no feelings of anxiety. This mode of propulsion has been sufficiently tested to confirm all which has been claimed for it. In comparison with reciprocating engines it is economical both in respect to the staff to tend it, the coal consumed, the expenditure of oil and the space occupied in a ship, while the absence of great bearing parts should lead to economies in repairs. It is, moreover, much simpler in construction than the present type of machinery, and tends to reduce the vibration, thus giving the gunners a more stable platform from which to fire. It is not yet known what pattern boilers the Dreadnought will have, but they will be water-tube. In the space available probably no others could produce sufficient steam to drive this huge, massive sea sentinel through the water at 19 knots an hour. Messrs. Vickers, Sons & Maxim are manufacturing the turbines.

AROUND THE GREAT LAKES.

Capt. C. H. Wilson, of Erie, who sailed the steamer Panay last season, will bring out the steamer E. D. Carter this year.

The steamer Loftus Cuddy, building for Capt. John Mitchell, at the Lorain yard of the American Ship Building Co., will be launched at noon Saturday.

A revised chart in colors of the Straits of Mackinac has just been issued by the United States lake survey office, and is for sale by the MARINE REVIEW.

Strathern Henry and Philip McMillan, both of Detroit, have been elected directors of the Detroit & Buffalo Steamboat Co., in place of Frank Masten and T. F. Newman, both of Cleveland.

The four 600-footers building by the American Ship Building Co., for the Pittsburg Steamship Co., will be named J. Pierpont Morgan, Henry H. Rogers, Norman B. Ream and Peter A. B. Widener.

The Cleveland Cliffs Iron Co., which has been located in the Mercantile Bank Building for a great many years, has secured quarters on the eleventh floor of the Rockefeller building, and will move March 1.

The schooner Frank D. Ewen, of which James O'Connor, of Tonawanda, is managing owner, has been sold by Capt. O'Connor to William Hackett & Sons, of Quebec. The schooner Ewen was one of the largest Tonawanda lumber carriers.

The Pittsburg Steamship Co. has not yet decided whether it will convert the barge Manila into a steamer. The proposed plan is to take the machinery and boilers out of the wrecked steamer Lafayette, and install them in the Manila. Both the Lafayette and Manila went ashore in the big storm which swept Lake Superior during the latter part of November, the Lafayette becoming a total wreck in so far as her hull is concerned. Wrecking operations are now proceeding on the Manila.

The Portland & Rockland Steamboat Line, Rockland, Me., owning the fast steamers Mineola and Monhegan, has been sold to the Eastern Steamship Co. Capt. Isaac E. Archibald, the sole owner of the Portland & Rockland Steamoat Line, will continue in command of the Monhegan. Capt. Archibald built up the Portland & Rockland Steamboat Line unaided. He is regarded as one of the most enterprising steamboat men on the coast. During his fifteen years of sailing he has never lost a life.

The Standard Motor Construction Co., Jersey City, N. J., is building a 500 H. P. Standard gasoline engine for a high-speed fishing boat that runs between New York and the fishing banks.

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OBITUARY.

It is with regret that the MARINE REVIEW announces the death of Capt. John W. Collins, engineer-in-chief of the United States revenue cutter service. While he had been ill for over a year, his illness did not take a serious turn until lately. Capt. Collins was born in New York city on Jan. 29, 1845. After attending the public schools of his native city and serving an apprenticeship in the shops of the South Brooklyn Steam Engine & Boiler Works, he was, at the early age of nineteen years, appointed third assistant engineer in the United States navy and assigned to duty on the frigate

CAPT. JOHN W. COLLINS.

Wabash. He saw considerable service during the civil war and at the close was commissioned as second assistant engineer in the revenue cutter service on April 7, 1866. He was made chief engineer on July 18, 1878. Up to January, 1892, the position of consulting engineer of the service had been filled by an engineer in civil life. Chief Engineer Collins was, prior to that time, engaged in duties as an engineer member of the International Marine Conference. So well were these duties performed that Secretary Foster selected him from the entire list of the chief engineers of the service and detailed him as consulting engineer, making him the first officer of the service to hold that responsible position. This selection was subsequently ratified by congress, creating the position of engineer-in-chief of the service on July 31, 1894. The work of this office was so largely increased on account of the building of new vessels that congress in 1897 created the grade of captain of engineers which carried with it the pay and emoluments of a captain in the line. President McKinley appointed Capt. Collins to this new position. He thus became the first marine engineer in the employ of the United States government to have what is commonly known as positive rank. At the time Capt. Collins was made consulting engineer of the service there was not a revenue cutter afloat having a triple expansion engine. The first machinery constructed under his direction, that of the Hudson, was fitted with a triple-expansion engine and a water-tube boiler. While in office he supervised the designing and construction of the machinery of twenty-two new revenue cutters.

In the death of Capt. J. G. Parker, at Ontonagon, Lake Superior lost its pioneer navigator. He was identified with the navigation of this lake long before the Sault Ste. Marie canal was built. In fact, he personally assisted in hauling around the rapids a number of little schooners that took care of the traffic of this lake prior to the construction of the canal. His life as a navigator antedated the lighthouse. Capt. Parker was born at Winchester, N. H., in 1821. In 1845 he and his brother Asa A., now eighty-six years of age, and past probate judge of Ontonagon County, made preparations for an overland journey to California but were dissuaded by their parents and went to the Lake Superior country instead in 1846. He was the mate of the little schooner Fur Trader in 1848, and carried stone for the first lighthouse to be built on the lake, that at White Fish Point. Capt. Parker built Ontonagon's first saw mill in 1851. The Fur Trader was lost at Eagle river in 1852, and Capt. Parker went to Milwaukee and bought the schooner George W. Ford to replace her. Capt. Parker continued to sail in her until 1870, when she went to pieces on a reef in Eagle harbor. He also sailed the steamers General Taylor and Mineral Rock. He sailed at one time also as a pilot between Detroit and Cleveland, but had retired from the lakes for over thirty years.

James Fitzpatrick, of Marquette, Mich., the oldest active sailor on the great lakes last season, died at Tonawanda, recently, as the result of an injury sustained in an accident at Cleveland last fall. He was seventy-eight years old, and worked for the last thirty-five years on lumber carriers, between the Tonawandas and Duluth. Fitzpatrick had his left lung punctured by a broken rib, by a fall into the hold of a schooner at Cleveland harbor in November.

Capt. Ole Hansen, one of the pioneer vessel men of Lake Michigan, died at Manitowoc on Saturday night last.

Capt. J. J. Olsen, who had sailed on Lake Michigan as a boy and man for more than forty years, died at Manitowoc this week.

Capt. Joseph Stover, Sombra, Ont., died this week of heart failure. He was a veteran master of the lakes, and was sixty-nine years old.

CANADIAN SOCIETY OF CIVIL ENGINEERS.

The annual convention of the Canadian Society of Civil Engineers opened at Toronto on Jan. 30, at the King Edward hotel. Mr. C. H. Rust, vice president, took the chair, and called upon Mr. Frank L. Sommerville to welcome delegates on behalf of Toronto.

The council report showed a substantial increase in membership. The number was 1,389 as against 1,261 in 1904. The Gzowoski medal award for 1904-5 was given C. B. Smith, M. E., for his paper on the construction of the Canadian Niagara Power Co., 100,000-horsepower hydro-electric plant at Niagara Falls, Ont. In the students' class the best papers were awarded: Mechanical, T. H. Schwitzer; mining, G. S. Cole; general, C. R. Young. There were no papers in the electrical section. The treasurer's report showed an income of $8,107.23, with the balance from 1904, giving a total of $11,378.04, of which $10,057.74 had been spent, leaving only $1,320.30 on hand.

In the banquet hall in the evening Mr. J. B. Porter

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gave a most interesting address on "Diamond Mining at Kimberly."

On Wednesday the members of the society visited Niagara Falls, and pleasantly inspected the great power plants there. An electrically cooked luncheon, given the members by the directors, was a feature. At one o'clock a complimentary luncheon was served, with everything cooked by electricity. About 40-horsepower was required to prepare the meal, and over 200 were seated. The head table was occupied by General Francis V. Greene, general manager of the Ontario Power Co.; Mr. Lumsden, the newly elected president of the society; Mr. Marceau, the retiring president; Supt. Wilson, of Queen Victoria Park commissioners, and Commissioners Langmuir, Jaffray, Raymond and Wilkes, Prof. McLeod, secretary of the society, L. L. and P. N. Nunn, chief engineers of the Ontario Power Co; E. B. Green, of Green & Wicks, architects, Buffalo; C. H. Rust, Toronto, and others.

Visits were later made to the Electrical Development Co.'s tunnel and power house, the Canadian Niagara Power Co.'s power house, and the Ontario Power Co.'s forebay. The journey through the tunnel was one of special interest.

In the evening the engineers held a smoker at the local club rooms. The elections resulted as follows:

President, H. D. Lumsden, Ottawa; vice presidents, M. J. Butler, Ottawa, C. B. Smith, Toronto, and W. McL. Walbank, Montreal; councillors, W. F. Tyle, Montreal; John Galfraith, Toronto; Duncan MacPherson, Ottawa; Phelps Johnson, Montreal; W. H. MacLeod, Winnipeg; G. H. Webster, Manitoba; R. McColl, Halifax; H. Holgate, Montreal; John Kennedy, Montreal; C. Fergie, Sydney, C. B.; E. A. Hoare, Quebec; J. S. Dennis, Calgary; E. Mahum, Vancouver; R. A. Ross, Montreal; L. A. Herdt, Montreal; R. J. Durley, Montreal; J. E. Hardman, Montreal; J. B. Porter, Montreal; J. G. G. Kerry, Montreal.

At the morning meeting, Feb. 1, Mr. W. J. Francis gave a paper entitled "Hydraulic Locks on the Trent Canal." A paper by D. W. Bell Dawson, D. D., M. Can. Sec. C. E., on "Tide Levels and Datum Planes on the Pacific Coast of Canada," and another on "Dam Construction," by Mr. Chas. P. Baillairge, were distributed among the members.

At the afternoon session the following important resolution was passed unanimously:

"That the council be instructed to represent to the Dominion government the importance of co-ordination of the various surveys conducted by its departments, and the adoption of such methods as will secure permanent records, both in the field and in the office, of all such work. In the opinion of this meeting, the complete working out of a scheme will involve very careful study, not only of the valuable work now being done in Canada, but also of the methods which have been adopted by the governments of other countries, and should lead to the establishment of a general topographical and geodetic survey scheme for the whole Dominion."

An interesting and valuable paper was given by the retiring president, Mr. Ernest Marceau, on "The Origin of Our Canal System," his object being to show that Canadian engineering had a historical as well as a practical side. Going back to the early days of Canada, he described the mile-long canal undertaken under the auspices of the Order of Sulpicians, to provide a canoe route by which the most dangerous of the Lachine rapids could be avoided. The work was begun in 1700 and almost completed when the contractor failed. Louis XIV endorsed the project in 1708, and it was reported upon in 1753, but it was never completed, although traces of it may still be seen. "Toronto's Experience with Conduits," was the title of the paper by Mr. C. L. Fellowes, assistant city engineer of Toronto, read by City Engineer Rust.

The annual banquet took place in the evening at the King Edward hotel. The meeting was distinctly merry and fraternal. Speeches were made by Hon. Mr. Emmerson, minister of railways, city engineer, Mr. Francis, Mr. McDonald, of P. E. I., and others.

LUMBER PRICES INCREASING.

Duluth, Feb. 5.—Rail rates on coal to the west from Ashland have been lowered to a parity with the head of the lake which is a drop of 60 cents a ton on all consignments for the west. As a result two coal concerns, the Clarkson and the C. Reiss are to double their equipment and increase their business while it is claimed that deals for new docks are under consideration.

The Great Lakes Dredge Co., which has brought the Lake Superior Dredging Co., is to establish a head of the lake branch at Duluth, and will make a large investment on the bay front. It is said that this investment will be about $200,000.

The larger share of the lumber to be cut next summer at the head of the lakes has been sold to go east by lake. Of course there are many millions of feet that will be sold later but it is understood that sales to this date have aggregated not less than 250,000,000 ft. This includes mills at Duluth, Cloquet, Scanlon, Winton and other near by interior points. The entire cut of some immense mills have been cleaned out, and most of what others will have. The winter has been so warm that logging is interfered with to some extent, and the cost of lumbering is higher than usual. There will be a larger share of the head-of-the-lake cut to go east this year than ever before, for the interior mills, that have in the past sent much of their timber west, are growing to like the eastern cargo trade more and more, and are now selling their entire cut to come via Duluth and the lakes.

Prices that are received now for lumber are the highest ever known. A few days ago one concern here sold 10,000,000, of No. 3 and better grade for $26.50 per thousand feet, which is $5 to $5.50 better than four months ago. It is the highest price ever known in this market. A great deal of the same grade of stock here has been sold for spring and summer delivery in 1906, for from $21.50 to $23 per thousand, and these sales were made within the past sixty to ninety days.

The Falls Hollow Staybolt Co., manufacturers of staybolt iron and steel bars, Cuyahoga Falls, O., reproduced in photogravure A. C. Gow's painting "Washington's Farewell to His Generals," as the picture part of its calendar. The reproduction is excellent and is well worth keeping.

Knaffl & Bro., Knoxville, Tenn., have for some years past made excellent compositions from life, employing negroes as models. For the second time Abram Smith & Son, wooden ship builders and rebuilders, Algonac, Mich., use one of these compositions for their calendar. This time the composition is entitled "Spring Cleaning," and represents an old colored woman washing the face of her son.

The Williams Gauge Co., Pittsburg, has recently opened offices at Cleveland, O. and Winnipeg, Manitoba. The Cleveland office is at No. 612 New England building with Mr. D. S. Tucker in charge and the Winnipeg office is in Room 3. Foulds block, with Mr. M. O. R. Jarvis in charge. Inquiries directed to these gentlemen for Williams safety feed water regulators, steam traps, pump governors and other goods will receive careful attention.

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MASTER AND ENGINEER.

In the past years a strained feeling existed between the deck and the engine room departments on board steam vessels. The origin of this bad feeling is historic. With steam came a new class of men into ships, and a new department over which the captain was commander, yet before its intricacies perfectly helpless. Previous to the introduction of steam everything on board was subservient to the master's will. He was master in name and in truth. A new master crept on board with the steam,—the chief engineer. The motive power lay in his hands. Ancient prerogatives were invaded. Civil war followed the evolution wrought by steam. Many of the difficulties between these two departments are now amicably settled, at least as far as the larger class of ships are concerned, although they linger still in cargo ships. The captain was not always as civil and courteous as he might be to the engineer. Once while bringing his ship alongside of the wharf in Buenos Ayres a gallant captain was indulging in sulphurous language incidentally aimed at the engineer, when that worthy looking up through the skylight cried loud enough for the passengers to hear, "Captain, the passengers will think you are talking to me."

In the eyes of some engineers of steamships the deck officers of their ships are profoundly ignorant. Here are some of the stories they tell: A young mate went into the engine room with a message from the captain to the engineer. The latter saw the other was interested, and began to explain things to him. Being a civil and obliging man he made no attempt to tell fairy tales to the stranger, and, moreover, he kept as clear as possible of all puzzling technicalities. He pointed out the cylinders, the various rods, the eccentrics, the shaft, and so on, explained roughly the uses of the various pumps, and auxiliary machinery, and the mate was genuinely pleased and interested, and said so. Then, when going up on deck again, a thought seemed to strike him. Halting on the ladder, he called the engineer and explained the difficulty. "Thanks, awfully, for showing me around, Mac; you've made the whole thing as plain as a pike-staff. But one thing I don't quite grasp. What are the boilers for?"

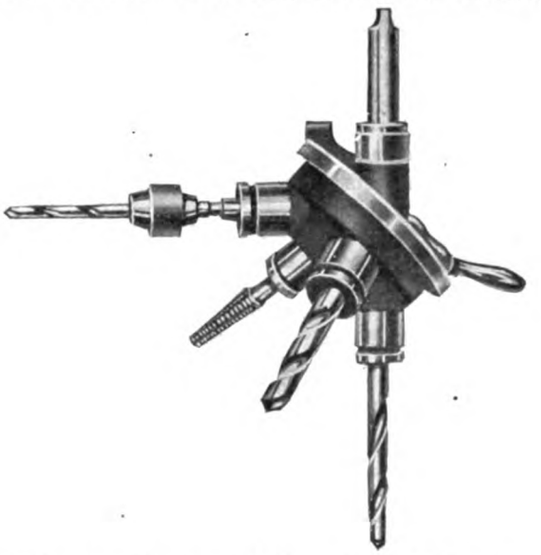
"A burly, thick-headed skipper had been given the command of a little steam collier. Going up with great pride onto the bridge of his new ship, the first thing that caught his eye was the engine room telegraph. 'What's that for?' he demanded. 'Why, that goes down to the engine room,' was the reply. 'You see all the orders on it—"Full speed," "Half speed," "Slow," "Stop," 'You just have to move the handle.' The old man was charmed. 'If Aa put the handle to "Full," will she gang full speed?' 'Why, certainly.' 'An if Aa put the handle to "Stop," will she stop ganging?' 'Certainly.' The old man was still more charmed. Finally, after thinking some time, he heaved a great sigh of pleasure. 'Why, that's fine, man! That's clever! That does away with all them saucy devils o' engineers.'"

Another old Scotchman was coming alongside at South Shields in his new command. With great stampings on the knob that rang the engine room bell, he had at last got abreast of where he wanted to be, but rather far out. He was puzzled as to the means of getting close in. He jumped on the bell knob and rang great, incoherent peals in the engine room. But it had no effect. Matters seemed to go slightly worse. Finally, in undignified despair, he turned and addressed his engineer by word of mouth: 'Aa divent waant to gang aheid! Aa divent waant to gang astern! But just gi'e 'er a wallop on the port side.' "—*Sailors' Magazine*, New York.

DIAMOND IMPROVED TURRET ATTACHMENT.

The Diamond improved turret attachment manufactured by the Power Specialty Co., 513 Washington Arcade, Detroit, Mich., is designed to be used on single spindle drill compressors, boring machines and lathes. Every manufacturer is aware of the fact that much valuable time is lost on the drill press by changing drills and handling work several times for the different sized holes. The Diamond turret attachment instantly converts the single spindle machine into a gang drill.

It is superior to the gang drill in that every tool in use is in perfect alignment with spindle of machine, thus a job clamped to the table, or a heavy piece being operated on, subject to a series of operations, need not be changed. For drilling and tapping this device has no equal. It is so constructed that it responds at once to the reverse motion of the machine. It also converts an ordinary lathe instantly into a turret lathe by simply inserting its shank into tailstock spindle of the lathe. Many operations may thus be performed



as readily as with a turret lathe, such as drilling, reaming, boring, tapping and turning. For special operations, the same forms of special tools as are used in turret lathes will be required.

The attachment consists of two pieces, one of which is loosely mounted on spindle, which fits socket in machine spindle, either taper or straight, as the case may be, while the other is adapted to revolve on first mentioned piece, being suitably guided and carrying four-spindle sockets, each having Morse taper hole to receive tools. By the operation of latch the two pieces are locked together at the same time clutch is engaged and tool is in motion. There is nothing complicated about this device. When ordering be sure to state size of shank and whether taper or straight, Morse or Brown & Sharpe.

In the table of turbine steamers, built and building, published by the *Marine Review* of Dec. 28. Turbinia II built for the Turbine Steamship Co. at Hamilton, Ont., is credited to Swan & Hunter as builders. Of course, it is well known on the great lakes that the Turbinia was built by R. & W. Hawthorn, Leslie & Co., Hebburn-on-Tyne, but it is easy to explain how the *Review* fell into this error. The table was taken from Mr. E. M. Speakman's paper on "Marine Steam Turbine Development and Design" as read before the Society of Naval Architects and Marine Engineers in New York and was published as printed in the proceedings of the society.

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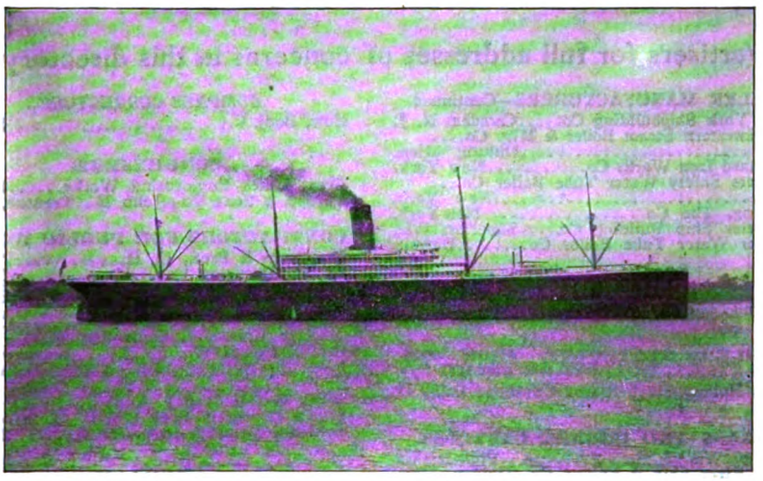
Hyde Windlasses and Capstans



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See accompanying index of Advertisers for full addresses of concerns in this directory.

AIR COMPRESSORS, AIR HOISTS, ETC.
Great Lakes Engineering Works.....Detroit.
Mietz, Aug. .....New York.

AIR PORTS, DEAD LIGHTS, ETC.
Marine Mfg. & Supply Co.....New York.

AIR PUMPS AND APPLIANCES.
Fore River Ship & Engine Co..Quincy, Mass.
Great Lakes Engineering Works.....Detroit.

ANCHORS.
Bowers, L. M. & Co.....Binghamton, N. Y.

ANTI-FRICTION METALS.
Cramp, Wm. & Sons.....Philadelphia.

ARTIFICIAL DRAFT FOR BOILERS.
American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit
Great Lakes Engineering Works.....Detroit

ASH EJECTORS.
Great Lakes Engineering Works.....Detroit.

ATTORNEYS AND PROCTORS IN ADMIRALTY.
Gilchrist, Albert J.....Cleveland.
Goulder, Holding & Masten.....Cleveland.
Hoyt, Dustin & Kelley.....Cleveland.
Jenkins, Russell & Eichelberger....Cleveland.
Kremer, C. E.....Chicago.
MacDonald, Ray G.....Chicago.
Shaw, Warren, Cady & Oakes.....Detroit.
White, Johnson, McCaslin & Cannon Cleveland

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Ritchie, E. S. & Sons.....Brookline, Mass.

BELTING (LEATHER).
Republic Belting & Supply Co.....Cleveland.

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Boston & Lockport Block Co.....Boston, Mass.
Cleveland Block Co.....Cleveland.

BLOWERS.
Power Specialty Co.....Detroit.

BOAT BUILDERS.
Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, David.....New York.
Lane & DeGroot....Long Island City, N. Y.
Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. P. & Co. Winthrop Harbor, Ill.

BOILER CLEANING DEVICE.
Power Specialty Co.....Detroit.

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Dearing Water Tube Boiler Co.....Detroit.
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East End Boiler Works.....Detroit.
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Fore River Shipbuilding Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Kingsford Foundry & Machine Works....
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Maryland Steel Co.....Sparrows Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher Water Tube Boiler Co....New York.
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.....Newport News, Va.

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Northwestern Steam Boiler & Mfg. Co....
.....Duluth, Minn.
Quintard Iron Works Co.....New York.
Roberts Safety Water Tube Boiler Co....
.....New York.
Stirling, The Co..... New York.
Superior Ship Building Co.....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.

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Bourne-Fuller Co.....Cleveland.

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Falls Hollow Staybolt Co..Cuyahoga Falls, O.

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Great Lakes Engineering Works.....Detroit.
Lunkenheimer Co.....Cincinnati.
Macbeth Iron Co.....Cleveland.

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"Long Arm" System Co.....Cleveland.

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Martin-Barriss Co.....Cleveland.

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Bunker, E. A. .....New York.
Upson-Walton Co.....Cleveland.
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CAPSTANS.
American Ship Windlass Co..Providence, R. I.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.

CEMENT, IRON FOR REPAIRING LEAKS.
Smooth-On Mfg. Co.....Jersey City, N. J.

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General Electric Co.....Schenectady, N. Y.

CHAIN HOISTS.
Boston & Lockport Block Co....Boston, Mass.

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Penton Publishing Co.....Cleveland.
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Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.

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..... Cleveland.

COMPASSES.
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Hubbell Co., H. W.....Saginaw, Mich.
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Starke Dredge & Dock Co., C. H..Milwaukee.
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Upson-Walton Co.....Cleveland.

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Schrader's Son, Inc., A..... New York.

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Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
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.....Newport News, Va.
Shipowners Dry Dock Co.....Chicago.
Superior Ship Building Co....Superior, Wis.
Tietjen & Lang Dry Dock Co.....Hoboken, N. J

DREDGE BUILDERS.
Manitowoc Dry Dock Co.....Manitowoc, Wis.

DYNAMOS.
General Electric Co.....Schenectady, N. Y
Mietz, Aug.....New York.
Thropp & Sons, John E.....Trenton, N. J.

ELECTRIC HOISTS AND CRANES.
General Electric Co.....Schenectady, N. Y.

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WANTED and FOR SALE Department.

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PROPOSALS FOR TWO SNAGBOATS.—U. S. Engineer Office, Vicksburg, Miss., Jan. 8, 1906. Sealed proposals, in triplicate, for construction and delivery of two steel snagboats will be received here until 12 noon, standard time, March 10, 1906, and then publicly opened. Information furnished on application. G. M. Hoffman, Capt. Engineers.

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Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Shipbuilding Co....Quincy, Mass.
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Lockwood Mfg. Co.....East Boston, Mass.
Maryland Steel Co.....Sparrows Point, Md.
Mietz, Aug.....New York.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher, Chas. D.....New York.
Moulton Steering Engine Co.....New York.
Newport News Ship Building Co.....
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New York Shipbuilding Co....Camden, N. J.
Northwestern Steam Boiler & Mfg. Co...
..... Duluth, Mich.
Quintard Iron Works Co.....New York.
Roach's Ship Yard.....Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co....Superior, Wis.
Thropp, J. E. & Sons Co.....Trenton, N. J.
Trout, H. G.....Buffalo.

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Cory, Chas. & Son.....New York.
Marine Mfg. Supply Co.....New York.

ENGINEERING SPECIALTIES AND SUPPLIES.

Kieley & Mueller .....New York.
Lunkenheimer Co. .....Cincinnati.
Northwestern Steam Boiler & Mfg. Co...
..... Duluth, Minn.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Hynd, Alexander .....Cleveland.
Hunt, Robt. W. & Co.....Chicago.
Kidd, Joseph.....Duluth, Minn.
Mosher, Chas. D.....New York.
Nacey, James .....Cleveland.
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Wood, W. J. .....Chicago.

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.....Perth Amboy, N. J.
Ross Valve Co.....Troy, N. Y.

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Safety Fire Extinguisher Co.....New York.

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General Electric Co.....Schenectady, N. Y.

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Sutton Co., C. E.....Toledo, O.

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Cleveland City Forge & Iron Co...Cleveland.
Fore River Shipbuilding Co.....Quincy, Mass.
Macbeth Iron Co.....Cleveland.

FLUE WELDING.

Fix's, S. Sons.....Cleveland.

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Ironville Dock & Coal Co.....Toledo, O.
Parker Bros. Co., Ltd.....Detroit.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Smith, Stanley B., & Co.....Detroit.
Smith Coal & Dock Co., Stanley B. Toledo, O.

FURNACES FOR BOILERS.

Continental Iron Works.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co..New York.

GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland.

GAUGES, STEAM AND VACUUM.

Lunkenheimer Co. .....Cincinnati.

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